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AUTHORITY AND RATIONALITY

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BEFORE an aggregation of persons can be said to constitute a community there must exist a sharing of a body of norms or values, or a system of beliefs or morals. In sociology this conception frequently appears in the term "consensus," and in political science a similar conception goes by the phrase "social contract." The two conceptions are not identical and an important point of difference will be touched on later, but according to this position knowledge of and adherence to the fundamental rules is necessary to group unity or cohesion.

To-day the function of formal rule-making or rule-promulgation that once was performed by religious bodies or churches has greatly deteriorated. Similarly, though not to the same extent, the rule-making of political groups has suffered since the rise of *laisser-faire* and Marxist theories of the State. Of course the Government still possesses large formal rule-making powers in the sphere of law but through its disseverance from religion it has lost the influence it once exerted on the larger body of rules contained in morality. Law is the explicit but comparatively small part of the morality or system of rules essential to community.

Yet no ruling or authoritative institutionalized body has developed to fill the gap. Nor has any unified religion grown up that, as Hoffding put it, can guard values. This has been true despite all the signs of social disorganization that have been detailed since the French Revolution, beginning with writers like Tocqueville and the Traditionalists and ending to-day with modern sociologists.

The causes for the failure of over a century of social scientists to find the solution to the problem of the disorganized or anomic community are enormously complex. By no means were all the causes

within their control. But one reason for their failure was their acceptance of the theories of human nature that have prevailed since the eighteenth century.

Around this time a view of man took hold that subsequently became part of several political philosophies such as the *laisser-faire*, the classical democratic, and the anarchist. It assumed that man possessed an inborn morality, but the proponents of the view seldom called it morality; they called it Reason. Men could reach agreement and unity and a common life because they all were endowed with Reason. Like this view in one respect, although distinct in many others, was that of a group of political philosophers whose ideas had an even earlier origin. This group is known as the state of nature theorists. While they did not hold that man was gifted with an inborn Reason or morality, they believed that man in a pure state, in a state of nature, had motives which for one branch of these philosophers were mostly good motives and for the other branch were mostly bad.

This is not the place to go into a minute tracing of the fate of these schools. It is enough to note that the views that eventually struck root in democratic and social scientific thought were offshoots of these thinkers. Men were born either with a Reason that would lead them to see eye-to-eye on the issues of right and wrong, or with good motives that would move them together toward the beacon of righteousness. By either theory no authority was necessary for men to achieve agreement or consensus and thus to lead the good life in community.

In the social sciences, and particularly in sociology and law, these theories gave rise to a fear of the *devoir-être*. Pre-occupation with the separation of facts from morality and values began to typify the social scientist. Like the theories from which it stemmed the theory of separability held implicitly that the study of facts alone could lead to agreement on the most important decisions to be made by men. Throughout there was a depreciation of the study of values which were held to be "culturally" determined while facts had an irresistible, universally acknowledged existence. The few students of values (in the main, philosophers) spent a large part of their time trying to say what values were, thereby suggesting that values were difficult to grasp. By contrast facts were acknowledged to be inescapable.

The most sophisticated and impassioned, and also the most influential, statement of the theory of the desirability of separating values from facts was Max Weber's. Essentially, as Hume and Mill had done before him, he separated the sheep from the goats by their use of certain words identified as normative, principally "ought" and "should." Statements of fact were to be recognized by the presence

of forms of the verb "to be," chiefly "is" but also by almost any predicate without the addition of "ought." In Bentham's phrase, it was held that "the word 'ought' ought never to be used except in saying that it ought never to be used." It did not occur to many persons to ask why "ought" ought to be permitted this one exceptional time.

In the further extension of the theory it was held explicitly that values, from the standpoint of merciless logic, under no circumstances could be inferred or derived from statements of fact. On this point, the absolute heterogeneity of fact and value, Max Weber laid great force. Since social scientists were only to manipulate facts and since values could not logically be reached, rationality could appear solely in the realm of facts. Of the two distinct and impenetrable kingdoms there were few persons indeed who held that rationality was to be found in the land of indefensibly emotional values.

There was one group, however, the French sociologists, who did yeoman service in the study of morals or values. The wake of the Revolution left them with much to concern themselves. One of their chief contributions, if such it can be called, was the dissociation of morals from supernatural authority. Morals for them implied a divine source and, since they had discerned that morals were man-made, they preferred the word "values" which had not the same implication. But instead of a supernatural authority they left the formation of values hazily in the hands of another entity called Society, which the anthropologists later changed to Culture. Unfortunately they left both the process by which morals or values were formed and the agent that was supposed to form them (Society or Culture) rather vague.

The conjunction of various influences, then, produced the following residue: Values are formed by Society or Culture and by the needs or desires of the organism, and are relative or subjective; facts are objects of the material world, and thus objective or absolute; rationality consists in the greatest avoidance of emotion or desire (namely, in objectivity), in the greatest avoidance of cultural bias, when dealing with (relating, manipulating, comparing, analysing) facts. Consensus or agreement is to be achieved by neutral communication, namely, by statements of facts alone, of the results of factual observation and analysis, with the least emotion, with the least cultural distortion. Again the unifying force of authority is unnecessary and indeed undesirable.

It is my belief that developments in anthropology and psychology, the one comparatively and the other experimentally and genetically, have shown up the weakness of this conception. They lead to the conclusion that fact and value never occur separately, are indeed not separate but homogeneous.

First a few words on fact and value in themselves, and later a more extended comment on fact and value statements. It will probably cause little disagreement to say that all values *in se* are facts. It now seems accepted in the social sciences that values are facts of the world and therefore may properly be studied. The reversal of the proposition, to say that all facts *in se* are values, will probably not obtain the same accord. In an attempt to get closer agreement on this I shall bring up three points, one concerning the selection of facts, one concerning fluctuations in facts, and one concerning the verifiability of facts.

The establishment of the existence of fact depends on human agency. It is a postulate, of course, that an external world exists but one which there is no need to challenge here. Without modifying the argument we can assume that a world of fact exists, with the single stipulation that it is known through human agency, that is, through perception or sensory data. But it is going far beyond this one assumption to say the world of fact is fully known or fully knowable. In truth we definitely maintain that the world is *not* fully known. (Whether it ever can be fully knowable need not be questioned here.) If it is not fully known, the question becomes, what aspects of it have we selected or do we select?

Here concur the work of the French sociologists on the ideas of space, time, substance, cause, memory, and language; and the work of anthropologists on the effect of language and training in organizing and defining sensory data and perception of heat and cold, pleasure and pain and so on. The minimum pressure required in order to produce pain, for example, has been experimented with on Englishmen, Dayaks of Borneo, Todas and Papuans. The Englishmen are quicker to feel pain. The natives of the West Indies are so indifferent to the pain of afflictions like yaws and venereal diseases that it is useless to instruct them in prophylactics and simple health rules. The Torres Straits Islander can detect a fainter red than can the Englishman but it takes twice as much blue for him to see it. The ordinary westerner, listening to the music of peoples who use smaller intervals, will think it out of tune but he cannot discriminate finely enough so that he can tell as they can when they are actually playing out of tune on their own scales.

Much of training in perception, it appears, is transmitted via the community's language. The language itself will embody the discriminations that are of value to the way of life of the community. A common language brings about a common perceptual field. A hunting community's language with its many terms for spears or guns will greatly differ from an agricultural community's language of plants and growth processes. Fishing communities make fine discriminations in marine life, desert dwellers do the same for sand topography, and

arctic peoples make minute distinctions in the character and form of snow. The Tunguses of Siberia have one name for a wild, and another for a tame, domesticated reindeer, one name for each age class, for a young female fawn, a doe with one fawn, a doe of three years with two fawns, and so on. The ordinary American can with luck distinguish between a deer and a moose and perhaps some one other but he has a rich business language, as do the English, who along with the Dutch have also a rich water or sea language. In large communities with wide expanses of territory, perception will vary from area to area, as the city boy learns when visiting his country cousin, who literally sees things in the woods that he does not. Anthropologists, too, often see things, such as a variety of vegetation, which the natives have never noticed, never needed, never named. Without a common background all eyes and all ears do not agree. A language shapes perception, and in handing over a language the teachers of succeeding generations tell them what is worthwhile perceiving in the world.

The conclusion I derive from studies such as these is that we see (perceive) what we need, or more strictly, we see that which we were taught to believe satisfies or frustrates our desires. Much of our education is given with the end of perceiving in order to avoid unhappy or painful experiences such as injury or death. Thus are we trained to perceive things we may not like to perceive.

There is an unseen (unperceived) world, then. Not that this unseen world cannot be seen. It can, or at least some of what we do not now see can be seen, but what proportion that is we may never know. This idea, I think, holds the answer to why our notions of matter have changed and ever will change. We never completely know matter which seems to change with our changing desires, training, and findings. New knowledge of the world, which may or may not be useful generally, arises from the difference in upbringing of persons. Members of the most static communities or even twins, though in many ways brought up to view things similarly, are subjected to many different educational influences. Unique combination of influences and desires leads persons to the perception of new facets of the world. We do not stumble on things, we find what we seek. The discoverer discovers, if not the exact one thing he wants most to find, at least some one of the things he is after. Thus does the ideal shape the real.

Recently a group of psychologists worked on the problem of the extent to which perception is influenced by need. Whatever else their results may show they do indicate that variations in needs or appetites are related to variations in perception. This may not be alone a simple short range affair of the thirsty man's seeing an oasis in the desert but a more long range affair of a dollar bill being seen to be

larger by the poor than by the rich. And according to all psychologies of appetites or of desires or motives, of tensions or needs, or the biologies of homeostasis, man is ever in a state of desire or need, mild though it may be. Absence of need or desire is equivalent to the death of the organism.

These two sets of studies, the anthropological and the psychological,[1] I think, justify making the proposition that perceiving and valuing occur simultaneously in the organism, that what is perceived cannot be separated from what is valued, that whatever is not valued drops out of perception.

The third point which I wish to make about facts *in se* concerns their verification. After being presented with the above statements about the simultaneous occurrence of perceiving and valuing, one might raise the objection that the fact still exists, regardless of the rôle of valuing in perception. But does it exist? Before something can be said to exist there must be agreement on what existence is, which depends on at least a similar cosmology, and both the agreement and the cosmology are affected by the whole process of training and need previously discussed. The external world may exist without us but it can only be known through us. If we do not agree as to the meaning of "is" or existence or being, there can be no establishment of valid knowledge of the world. An example of this to-day is the status of telepathic phenomena. Do such phenomena exist?

If we again look over these qualities we have said are characteristic of facts—(1) they are perceived only when valued, (2) their qualities fluctuate with different emotions or needs, and (3) their validation depends on agreement—we can see that these qualities are the ones also characteristic of value, and indeed are the very qualities for which value has been held in disfavour by social scientists.

Perception is thus not passive, but active, seizing upon the world with intent, at once half-perceiving and half-creating it. As such it does not fit the philosophic and social scientific notions that try somehow to separate it from a process of valuing. One of these notions is "value-relevance," a phrase that social scientists, again following Weber, use to excuse their preference for certain problems as against others. They have tried to say that while it is true that they are biased in their selection of a problem (that the selection of problems is relevant to values), once the problem is chosen their investigation

[1] The sociologists referred to include Durkheim, Georges Davy, Halbwachs, Bouglé, and Antoine Meillet. A convenient review of some of the anthropological materials appears in A. M. Hocart's *Progress of Man*. The psychologists referred to include G. Murphy, Postman, Bruner, McGuinnies, Prohanshsky, Kretch and Crutchfield, R. N. Sanford, R. Schaefer, Sherif, Pastore, and Adelbert Ames, Jr.

of it proceeds on a rational or factual plane where values never intrude. But there is no temporary putting off of value in life.[1]

Also to be rejected is the view which the psychologists of perception themselves now seem to have taken. The phrase expressing the view, "needs keep ahead of percepts," is another variant of the old philosophical thesis that reason is the slave of the passions, a view reflected, for example, in the works of Hume, Perry and Stevenson. Nor can one talk, as Kant did in the *Critique of Pure Reason,* of making a place for faith by moving knowledge over to the side. Also, the neat little separation that many proponents of "scientific method" took pleasure in making, the one between induction and deduction, now seems rather like a device of salesmanship. Similarly the old distinction of a metaphysics and a physics (or even a pro-physics) seems to have lost its absoluteness, while the idea of avoiding bias or slant or passion for but a second turns into a game of words—those on our side and speaking our language we shall call "objective," those on the other side are "prejudiced"; we live by reason, they live by impulse. In the field of observation and reporting the question to ask now becomes not "who is objective?" but more like "who feels and sees and dreams as we do?" In the whole intricate lightning process of perception there is no way of inserting a razor blade and saying, "this is seeing and this other is valuing."

Turning now to the problem of the separation of so-called fact and value *statements.* (This was Weber's chief concern in the general fact-value area. He talked more about fact and value statements than about fact and value in themselves.) I offer the following two supplementary propositions: Any so-called value statement pertains to an object or event, and may or may not elide a fact statement concerning the existence of that event. This first proposition is not difficult to illustrate. For example, if I state that something ought not to be, I also say that something exists. On the other hand, if I say that something ought to be, I at the same time say that something does not exist. The second proposition, one more difficult to present,

[1] For example, with the exception of John Hallowell, the contributors to a symposium entitled, "Politics and Ethics" (*American Political Science Review,* 1946) reveal an underlying belief that the process of valuing can be turned off and on, more or less at will. Even the psychologist H. Cantril, who has been involved in the work of Ames and the Hanover Institute of New Hampshire, can deliver an address entitled in the style of the Enlightment, "The Development of a Scientific Morality" (Presidential address to the Society for the Psychological Study of Social Issues, 1948), and can speak in it as though the making of "value-judgments" in one's work can be either encouraged or discouraged. As a result he unwittingly ends by proclaiming a particular system of values clearly reminiscent of democratic liberalism. All this in spite of his definition of perception as "an implicit awareness of the probable consequences an action might have for us with respect to carrying out some purpose that has value for us."

is that any so-called fact statement pertains to an interest or desire and elides a value statement concerning the degree and direction of that interest. Though some attention has been given recently to the elisions in so-called value statements, statements of fact have not been given like treatment. As long as attention is focused only on the descriptive content of fact statements, the portion of value in them will escape notice.

To realize that statements of value are elided in all statements of fact one should recall first that statements are conventional, grammatical units of verbal communication. In such communications it is now coming to be recognized by students of the subject, the verbal elements contain only a small part of the meaning that is transmitted in the entire communicative situation. A catalogue of gestural and non-verbal factors (tone, pitch, accent, speed, volume, etc.) is present to add to and clarify the meaning. Sometimes the verbal element contains merely a hint, sometimes merely the part of the communication requiring precision. That the other meanings remain implied rather than verbal makes them no less real.

Now an understanding of human discourse requires an understanding of its purposes. In all communication the purposes of communicating, even when not expressed, are taken into account in interpreting the communication. Thus if I say "There is a tree," the statement (since it has me as an utterer) includes both the unspoken preliminary, "I want to say that (there is a tree)," and the unspoken final, "for the reason that. . . ." And these motivational aspects are included regardless of whatever the reason may be in the situation and whether or not the reason may be accurately gauged by the hearer. Language has an inevitably practical function, and every communication functions normatively. A fact statement, like a value statement, confesses to a value or interest and influences or determines what ought to be done or thought by the recipient of the statement. There is no neutral communication.[1]

The claim that value statements cannot be derived from fact statements, in itself, it should be further noted, hides a value. If a

[1] A search for the reasons why the view has developed that communication can be neutral must take into consideration the prevalence of print in modern times. Because of its durability and of the conditions necessary for the reader to decipher it (e.g., light and concentration), print is a skeletonized and highly impersonal form of communication. For those like scholars who use it most, print has removed in point of time and place the communicator of words and thus made possible a view of fact statements that ignored that statements have to be stated, even though stated by persons whom one never meets or by persons dead for several millennia. In no small measure due to print, I believe, the pragmatic context of all communication has been lost sight of. The introduction of writing into communities, from what is known of it, seems to have had some effects similar to this later introduction of print.

person says, "you ought to do this," and you deny that it follows from the facts, you mean to say, in part, that some other course of action or thought is open to you, which of course cannot be true. A course of action has to be based on a value or preference which, according to the proposition, cannot be derived from any number of facts whatsoever. What you often want to say in making such a denial to the person is that you do not like the course of action that results from what he perceives.

If, then, fact statements elide preferences while preference statements elide facts, and if perceiving and valuing occur simultaneously in the acts of the organism, why is there a distinction in language between fact and value or preference? I think the matter is one of linguistic emphasis. Instead of an uncrossable line between value and fact, the distinction is one of degree on a scale of value or fact importance. The fact-value distinction in language merely reflects a linguistic way in common usage of classifying communicated desires in some hierarchical form.

Furthermore, saying that the distinction appears in common usage is a long cry from saying that persons other than social scientists use the distinction in the way recommended by Max Weber. Far from being a common or natural way of looking at things it appears that once capable of making this artificial separation of facts and values the mind loses a certain virginity. Students and scholars in other disciplines have to be wheedled and coaxed into adopting the distinction, and many of them never feel right about it.

The is—ought—must continuum, which includes many intermediate words signifying other degrees of desiring or valuing, elides at its "is" end an express statement of desire because of its clearly understood level of value, which is usually low. The "ought" or "must" side of the scale often elides statements of fact because of the primary intention to communicate a high level of value. Otherwise expressed, the verb "ought" is simply an auxiliary to predication which must be used when the communicator wishes to make clear a high level of value. The absence of "ought" merely indicates that the value is either of small degree or needs no verbal expression to be conveyed.

This means that, generally speaking, the so-called value statements deal with statements of the utmost importance to the communicator. It further signifies that confining oneself to dealing only with so-called fact statements in times when a general confusion in morals or values exists limits one to dealing chiefly with trifles. It doubtless was due to this in some measure that social scientists got the reputation in Europe of being trivialists and *sconclusionati*, persons unable to reach a conclusion about important matters. Hume saw this in his later years, I believe, when he complained that throughout

his life he had castrated his work. Such was the idea of rationality that was associated with the fact-value separation, that reason became more and more depreciated, for it was possible to be "rational" only about unimportant matters.

One other strange thing about the present period, which I am beginning to guess will go down as a mere mistaken incident in the history of social and political theory, is that neither Hume nor Weber by their own logic, namely, once they had claimed that facts and values were completely heterogeneous, could prove that social scientists ought to omit value judgments in their work. The twain "ought" and "prove" never could meet. And if one reads over Weber's most important work on the subject one can see that sociologists followed his lead not because of his proof but because he used the most colourful words in his ordinarily quite staid lexicon. His writing contains words which by his own standards ought to be proscribed—"Should," "must," "motley cultural values," "untenable," "abuses," "abhorrent," "cult of personality," and so on. In fairness to Weber it must be said that he never thought that separating fact and value statements was an easy task; but, also in fairness, he never adequately realized that cool words (including statistics and formulae) comprise for some classes of persons a more passionate language than hot words. And, of course, he never went into the perception question.

Naturally Weber was not exempt from the error of taking communication out of its practical context. Indeed, scholar that he was, he remained peculiarly vulnerable to it. But besides this, he obviously was impressed in his fact-value writings with the irreducible quality of value-statements. And, to my mind, this is truly the distinction worthy of study—the greater obligatoriness or binding quality of the "ought" statements.

What research has been done on the idea has been done indirectly, with other purposes in view, but even so it has been enough to indicate that the problem takes us back to the concept of authority with which this paper began. It was remarked earlier that the French sociologists and likewise modern anthropologists had left matters vague in reporting that values are created or transmitted by Society or Culture. To-day the genetic studies of psychoanalysis and hypnosis can help trace more exactly the growth of morals and values.

The points that follow cannot be more than listed here. They are developed in a forthcoming book, *The Government of the Passions*. But their mere listing may suggest, at least, the way in which authority and value, and therefore perception, too, are related.

In brief then, what these studies indicate is (1) that the acquisition of morals or values by the person seems always to be connected with a source; (2) that this source is conceived as authoritative by the

person (that is, is held to have unusual power, moral wisdom, and a concern for a common good which includes the person); (3) that the most durable morals and values are acquired from such authoritative figures in early life and make up what we know as conscience; (4) that though some of them may be irreducible, many of the morals or values most tenaciously held can be and often are modified in later life; and (5) that these modifications when they occur take place again through the agency of authority.

Thus one can see that confining attention to the so-called fact statements distracted research from the methods of changing values or morals, tended to make them considered irreducible, and slighted the study of methods for their transmission, clarification, and renewal. Such relevant subjects as ceremony, tradition, art, ritual, authority, and paradigmatic education, in so far as they were studied, were usually held to be primitive or non-rational phenomena.

In addition the theory of the separation of facts and values led to a virtual stalemate of the theory of consensus. Although it is one of the oldest theories in sociology, little progress has been made with it. In fact it took on in its later years some of the colouration of the dominant theory of human nature by holding that consensus was a matter of rational agreement ("rational" again in the sense of a neutral analysis of facts). As a result a significant break appeared, one not yet adequately recognized, between the sociological theory of consensus and the political theory of the social compact. The latter theory never completely lost sight of the idea that a theory of community must include a statement not only of the understandings among community members but also of the understandings and relationships, however inarticulate, between them and the forms of communal authority.

In conclusion: The theory of the separation or separability of fact and value or fact and value statements simply fails to withstand examination. Man is a desiring creature with his wants and his sight fused; with his wants and his sight moulded and directed largely by the authoritative parts of his community. A social or political theory that holds that the knowledge transmitted by these parts of the community is pseudo-knowledge or non-rational, a theory that glorifies the relatively unimportant facts of life, widens the division it sometimes aims at repairing.

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THE AXIOLOGICAL THEISM OF A. E. TAYLOR

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I

TAYLOR'S AXIOLOGICAL THEISM

If a rational argument is to be advanced for the existence of God, it must be some form of the cosmological, depending on the concept of causation, or the ontological, an elaboration of the concept of being. The metaphysical fertility of the axiological approach to theism consists in its reformulation of the ontological argument—viz., that the nature of existent reality itself is indicative of supranatural being.

While the Platonic studies of the late Professor A. E. Taylor have been more warmly received than his axiological speculations, it may yet be that his analysis of the nature of value experience and its implications for metaphysics will prove of equal worth. If logical positivism or a blank existentialism are not to have the last word, then a realistic theory of value must be established. It is the thesis of this paper that Professor Taylor's objectivistic axiology is such a defensible theory.

In an essay entitled "The Vindication of Religion," Taylor argues that no naturalistic explanation of the universe can ever get beyond collocations; that the duality of "law" (causal connections) and "facts" (collocations) is such that either nature is not explicable at all or must be explained by something "outside" on which nature depends.

> Thus we reach the conclusion that either the very principles which inspire and guide science itself are an illusion, or nature itself must be dependent upon some reality which is self-explanatory, and therefore not nature, but in the strictest sense of the words, "supernatural" or "transcendent"—transcendent, that is, in the sense that in it there is overcome that duality of "law" and "fact" which is characteristic of every part of nature. It is not "brute" fact, and yet it is not an abstract universal law or a complex of such laws, but a really existent self-luminous Being, such that you could see, if you only apprehended its true character, that to have that character and to be are the same thing.[1]

This statement of the problem of theism is in the Anselmian ontological, rather than the Aristotelian cosmological, tradition. It is concerned with the intelligible nature of a Being combining causal efficacy and a determinate character—i.e., standards of value.

[1] *Essays Catholic and Critical*, edited by Gordon Selwyn, London, Society for Promoting Christian Knowledge, 1926, p. 55.

While it need not be assumed that value as such can give rise to existence, yet if value judgments are not completely relativistic, then "in the last resort . . . the *raison d'être* of any fact must be a value," and the reason for the totality of being must be absolute value.[1]

Taylor's whole argument may be summarized as follows: In an organic, hierarchized universe, the explanation of any individual, or any realm of being,or any level of reality is to be found in its dominant features, viz., its values. Value, though it transcends the temporal, is not its own complete explanation; nor is it, though it may account for the direction of the becoming of any actual process, the only sufficient explanation of being. Being and value together constitute the "sufficient reason," the "intelligible explanation," the *raison d'être*, of all that is. Temporal-spatial actuality is not its own explanation, since it is informed by moral (and other) values not derivative from simply temporal process; it is dependent on a higher, more real, more ultimate reality, which is the ground of becoming and is also the end toward which it, as an increasingly valuable "organism" (or complex individual process) tends. This reality cannot be purely conceptual, abstract, or ideal. Nor can it be the universe as a perfect whole, for then becoming—i.e., actual history—would be only a sham. It must be, therefore, a real being, distinct from the rest of reality, and that which determines all other being. The existence of such a being is, while not demonstrable, an intelligible explanation of the actual becoming that constitutes the historical reality of the universe. Ultimate reality, being utterly good, must be out-going, expansive. It must, in fact, be creative, appreciative, loving mind, intelligently bringing into actuality that which is worthy to be.[2]

> As Timaeus says in Plato, the very reason why there is a world of creatures at all is that the All-good is wholly free from φθόνος, the "dog-in-the-manger" spirit which seeks to engross felicity to itself, and therefore makes the creatures for His goodness to flow out upon. He cannot be wholly blessed, except in blessing.[3]

Taylor's axiological argument for theism is thus a re-statement of the Platonic-Aristotelian-Scholastic doctrine that value is objectively real and that the sufficient reason for a value-charged universe must combine in itself goodness and being. It is consciously and intentionally pre-Kantian in orientation, and is maintained with full awareness of the nature of positivistic criticism of the objectivity of value-experience.

[1] *The Faith of a Moralist*, Macmillan, London, 1930, Vol. II, p. 195. (Hereinafter referred to as *The Faith*.)

[2] Though we must remember that we do not know what mind is, even in ourselves. The concept of mind is thus an anthropomorphic symbol, but it is not *mere* symbol.

[3] *The Faith*, I, p. 244.

II

THE DEVELOPMENT OF TAYLOR'S THOUGHT

Taylor's two early books, *The Problem of Conduct* (1901) and *The Elements of Metaphysics* (1903), present a type of voluntaristic personalistic idealism not unlike that of Josiah Royce. Value is considered as wholly subjective and relative. In *The Problem of Conduct* Taylor says:

> In order to guard against any possible misconceptions, it is well to insist in the plainest terms at our disposal upon the purely "relative" character of all worth or value whatsoever. "Absolute" worth is, if you take the term at all strictly, no better than a flat contradiction. To say that a thing has "worth" or "value" means no more than that there exists beings to whom the possession and ultimately the enjoyment of the thing in question affords pleasure.[1]

Even more specifically, Taylor asserts:

> Things have worth for us because they meet our wants.[2]
>
> It is for empirical psychology to say what qualities are and what are not of "absolute" worth for human beings.[3]

This empirical view, later expressly repudiated by Taylor,[4] is, of course, very similar to Perry's satisfaction-of-interest theory,[5] and is practically identical with D. H. Parker's dictum:

> What I ought to do is what such a system (of desires) wants to do.[6]

The ethical implications of this view, as worked out in *The Problem of Conduct*, are most instructive as showing the circularity and inner contradictions of such an axiology. Not only does it fail to provide practical moral guidance, it is involved in unsolvable dilemmas.[7] Taylor falls back on Bradley's formula, "my station and its duties"[8] as giving "the nearest approach that morality possesses to a coherent ideal,"[9] realizing all the while that it is as theoretically indefensible as it is practically necessary.

This empirical theory of value is at the opposite pole to that of *The Faith of A Moralist*, whose author could write:

> Our geometrical knowledge may be very much clearer and more articulate than our knowledge of life and sentience, and this again much clearer and

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[1] *Loc. cit.*, p. 166. [2] *Ibid.*, p. 168. [3] *Ibid.*, p. 169.

[4] See Taylor's biographical statement, *Contemporary British Philosophy*, Second Series, p. 271: "I suppose that at this time in my life I was not far from developing into a kind of 'Positivist'."

[5] *General Theory of Value*, New York, Longmans Green, 1926.

[6] *Human Values*, p. 39, New York, Harper, 1931.

[7] *The Problem of Conduct*, fn., p. 201: "Ethics, to parody Mr. Bradley, consists mostly in finding bad reasons for being what you cannot help being."

[8] F. H. Bradley, *Ethical Studies*, Second Edition, Oxford University Press, 1927, Essay V, p. 201: "There is nothing better than my station and its duties, nor anything higher or more truly beautiful." [9] *The Problem*, p. 277.

better articulated than our knowledge of our own moral being, which is, as Shelley said, "a mystery even to ourselves." And yet it may well be that, for all its dimness, it is just this knowledge which brings us most directly into contact with the very heart of reality.[1]

Taylor surely had his own intellectual and spiritual development in mind when he commented on Fichte's saying, "The kind of philosopher one is depends upon the kind of man one is," that, while the saying is true, it is even more true that we do not know clearly and surely, but only discover gradually what our true natures are. Taylor's philosophic pilgrimage led from his early rationalistic agnosticism, through the gradual analysis of rationality, to the acceptance of an *a priori* element in experience, and through a steadily deepening insight into the nature and implications of purposiveness, to his final Christian-Platonic philosophy, in which human purposiveness is held to be a phase of the value-reality of a temporal order having its roots in an eternal order which is determined by an eternal being.

III

KNOWLEDGE OF VALUE

The Gifford Lectures, 1926–27 and 1927–28, gave Professor Taylor the stimulus and the opportunity to work out a "natural theology" for the Christian faith he so devoutly held. He spoke as a moralist, "who took morality seriously" and generalized his moral theory into an objective axiology with metaphysical implications. The acuteness of his axiological analysis seems to have been somewhat obscured, perhaps by objection to other parts of the Lectures, such as his special doctrine of the Church. His theory of value, however, can stand on its own feet quite apart from the details of the traditional Christian dogmas with which Taylor associated it. It is, in fact, one of the most cogent statements of a realistic theory yet made. It is objectivistic, what John Laird[2] termed "timocratic," W. M. Urban[3] "axiological." It is similar to A. N. Whitehead's[4] objectivistic relativism, but more explicit in its distinction between being and value and in its characterization of value. It is in sharp contrast to R. B. Perry's[5] interest-centred neo-realism, which is naturalistic and ultimately subjectivistic, and is in outright opposition to D. W. Prall's[6] and D. H. Parker's[7] naturalistic subjectivistic relativism.

[1] *Loc. cit.*, Vol. I, p. 66.

[2] John Laird, *The Idea of Value*, Cambridge University Press, 1929.

[3] W. M. Urban, *The Intelligible World*, George Allen and Unwin, London, 1929.

[4] A. N. Whitehead, *Process and Reality*, The Macmillan Company, New York, 1929.

[5] R. B. Perry, *General Theory of Value.*

[6] D. W. Prall, "A Study in the Theory of Value," *University of California Publications in Philosophy*, Vol. III, 1921.

[7] D. H. Parker, *Human Values.*

Taylor's theory is realistic as contrasted with Nicolai Hartmann's[1] phenomenological theory. It is nearer to the Platonic idealistic tradition than is Laird's timocratic theory because it is more intimately related to mind. On the other hand, it is more realistic than Urban's idealistic axiology, though Urban himself holds that his own view is "above the idealistic-realistic battle." Finally Taylor's thought is hardly touched by modern instrumentalism and simply ignores contemporary logical positivism.

Taylor explains that his theory of knowledge is "essentially Thomistic, but with what a Thomist would probably regard a leaning toward an *outré* realism."[2] He argues that we know the object of our knowledge directly, without the intervention of any *tertium quid*. "The form of lapideity," he says, "as it exists in the eye" and "the form of lapideity as it exists in the stone"[3] are not numerically identical, and yet the form is the same in both instances. While value is not a form of the same order as lapideity, it is none the less characteristic of acts and events, and can be known by mind. "The 'disinterested spectator'," writes Taylor, "*recognizes* the already existing goodness of the act he rightfully approves, he does not *bestow* the value on the act by his approving contemplation."[4]

Taylor's epistemological realism is thus matched by a metaphysical realism. The epistemological argument is buttressed by two claims both pointing to the inseparability of value and existence.

The first argument is that we never experience value without fact or fact without value.[5] We distinguish these categories by reflective analysis; but any value we experience is always embodied in a here-now complex. Further, any real goodness we value is the activity of a real individual. Only by abstraction, and for logical purposes are values considered as universals. Values are always concrete. They are not subsistent universals.

In the second place, Taylor argues, we find no separation between "facts" which are given and "valuations" which are "put on" the facts. The facts and the values are given together; or rather, we have always "facts-in-valuation," never mere facts in isolation, nor mere valuation. This is the hard core of Taylor's realism, rejecting alike the objective idealism of Hartmann's otherwise admirable analysis of value and the subjectivism of naturalists like Perry. Values are not "after-thoughts" or "psychic additions" of our own personal creation:

> And to myself it seems clear, again, that the beauty of the rose is no more read into, or added to, the fact of the rose than its colour. Both are, in the first instance, *found*, not brought, though, as the colour seems not to be found

[1] Nicolai Hartmann, *Ethics*, 3 Vols., Translated by Stanley Coit, Macmillan, New York, 1932.
[2] *The Faith*, Vol. I, p. 58.
[3] *Ibid.*, p. 42.
[4] *Ibid.*, p. 43.
[5] *Op. cit.*, p. 38.

except by creatures with eyes, so the beauty, too, is not found by the man who has not the "inner eye" by which beauty is discerned. . . . Now all this seems to be no less true of our moral "ideals." As I do not add either the tints or the beauty of the rose or the sunset *de meo* to a rose or a sunset "given" without beauty, or even without colour, *find* the colour or the beauty *in* the given, so I do not by an "act of valuation," make Jonathan's affection for David or the self-devotion of Mettus Curtius, the humility of St. Francis, or the patient labour of Darwin good; I find the goodness there in them.[1]

This analysis of the knowing-situation leaves many questions unanswered; but it does have the merit of insisting on a realistic distinction between the known and "the as yet undifferentiated continuum of the known-and-interacted-with."[2] Taylor argues shrewdly against any atomistic sensory theory of discrete sensa put together by mind. He also argues that it is impossible to draw any hard-and-fast line between perception and interpretation. Finally, he asserts that valuation is an integral part of the process of knowing. Acts are, he asserts "objectively good, exactly as iron is hard and lead soft."[3]

This view seems at first glance identical with that of G. E. Moore, viz., that good is a quality like the quality yellow; but it is not identical, for Taylor holds—or at least, his theory implies—that good is an objective *predicate* recognized, rather than an *attribute* perceived. His view is, in this regard, exactly that of Urban, who asserts:

If the (axiological) view is adopted . . . we shall cease to contrast judgments of reality with value judgments in any absolute sense.[4]

This statement must not be taken to mean, at least in regard to Taylor's theory, that value and being are identical. It means that they are equally real. Taylor goes on to assert:

The really given is a whole situation which includes ourselves, with our definite endowment of more or less coherent schemes of value, our hopes and fears, our choices and avoidances. The history of man is no tale of the superimposition of an edifice of "mental construction" on a basis of *mere* giveness. It is the story of the gradual clarification and progressive definition of apprehensions, contacts with the "given," cognitive and practical alike, which have been there all along in vague and implicit form, in any life we can recognize as qualitatively of a piece with our own.[5]

If this be so, he concludes, it is arbitrary to assume that knowledge of, e.g., physical structure, throws light on the general character of reality, but that knowledge of aesthetic, moral and religious being do not. The most illuminating insights into the character of the real are not necessarily the most distinct. Our notions of the good may be more confused than our notions of geometrical structure, but this

[1] *The Faith*, Vol. I, p. 60. [2] *Op. cit.*, p. 58. [3] *Ibid.*, p. 61.
[4] Urban, W. M., *The Intelligible World*, p. 157.
[5] *The Faith*, I, pp. 64–5.

is no warrant for supposing that the good is any less deeply ingrained in the real or any less pervasive than spatial determination.

IV

VALUE AS WHAT OUGHT TO BE

Value, then, for Taylor is objective. It characterizes objects known by mind. It is not added to being by mind. It is *there*, in the world. But what is it? What is value? Taylor's answer is that value is what ought to be.

The good act, Taylor says, is the act that ought to be done. It is not its oughtness, however, that makes it good. To say that it is good because it ought to be is to make goodness, or generic value, derivative from a subtype of goodness, ethical value. The goodness generates the oughtness. The act ought to be done because it is good.

Kant erred, Taylor holds, in confining his attention to the single act rather than "the *So-sein* which reveals itself in the performance."[1] This *So-sein* is the character of the moral agent. Though Kant was trying to avoid metaphysical assumptions, the basic principle of his theory, Taylor argues, leads from *doing* to being, for on Kant's theory, an *act* is of absolute and intrinsic worth only when it is revelatory of a character or quality of a *doer* who is its free cause. The ultimate moral imperative is, therefore, not "do this," but "be this." If the ultimate good is a good will, the nature of morality, says Taylor, is not accurately conceived in Kant's "What acts ought I to do?" but is really "What manner of man ought I to be?" Nietzsche's injunction, *Werde der du bist*, is thus

> the perfect expression for the supreme "categorical imperative" . . . if only we are careful to remember from the first that I do not at the outset know *wer* or *was ich bin*. I am a riddle to myself, and it is only in the process of the *Werden* that I slowly and painfully gain some insight into my *Sein*.[2]

Moral process is thus activity of a free agent who is becoming more and more what it is his nature to be. Moral process is becoming, a change in value. It is true to say that a man *is* (in part) what he ought to be when he is *becoming* what he ought to be, but such a statement is incomplete and circular unless it be recognized that he ought to be good.

> When I speak of the good as *satisfactory* I mean that which contents men who are what they ought to be and will content me when I am what I ought to be.[3]

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[1] *The Faith*, I, p. 67. [2] *Ibid.*, p. 68.

[3] *Ibid.*, p. 104, fn. Taylor was quite sensitive on this point, since it involved, if not an abandonment, at least a re-interpretation, of his earlier position. Several times in the Gifford Lectures, Taylor quotes Wordsworth. Might he not here also be echoing the *Prelude*? Cf. Book I, lines 348–49,

> "The calm existence that is mine when I
> Am worthy of myself."

The transition from value as what satisfies men who are what they ought to be to value as what actually ought to be is a subtle one requiring analysis beyond the limits of this discussion. We will only note that the transition depends on the validity of the realistic epistemology being presented here, with its concomitant metaphysical assumption of the intimate association of value and fact in the actual world. Being and value are ultimate ontological predicates, irreducible to each other or to any other categories, inseparable but not identical, related to each other by the further category of what ought to be, a category so related to both being and value that it can be a bond between them.

Holding that only individuals are real, Taylor avoids a nominalistic pluralism by asserting that an individual cannot be defined in isolation, nor in purely temporal and spatial terms.

> If we meditate the reasons which have led Professor Whitehead to make a sharp distinction between *events* and *objects* and to insist that location and date belong properly to events, to objects only secondarily in virtue of their "ingredience" into events, we might even be led to the view that *individuality* is precisely the feature in things which resists our attempts to locate and date it.[1]

Translating Whitehead's language back into Taylor's more usual use of terms, this passage means that an individual (what Whitehead calls an event) is an individual not because it is spatially and temporally distinct from other individuals, but because it is a locus for different values. Since values have more than one sort of being, or since their *becoming* implies an equivocal, rather than a univocal, reference to being, the presence of the values is not definable in any one temporal or spatial mode. A moral act must be a genuine historical event with a definite time and space locus or it is not a real becoming. But the morality of the act is not limitable to *that* event, nor to the sum total of all events. Moral value thus transcends temporality, not as Kant thought, by referring to extrinsic consequences, but intrinsically, of its very nature. Not only moral value, but every value points beyond its concrete embodiment to eternal being. Their *validity*, their right to be, is eternal.

Man has his own value, but as a part of the larger organism of the actual world, his are not the only values that are real. The objective axiological order is supra-individual, supra-social and supra-human. The *world* ought to be, is worthy to be, and ought to be better than it is.

[1] *Op. cit.*, p. 54.

V

A VALUE-CHARGED UNIVERSE

The one real world, says Taylor, is "a hierarchized, or many-levelled whole." To be understood, it must be grasped on all its levels. The notion that a human being is "four buckets of water and a bagful of salts" is a gross over-simplification. Taylor cites as an illustration of the failure to attain an adequate view of the actual —

> The *mot* which defines a violin solo as "the dragging of the tail of a dead horse across the intestines of a dead cat."[1]

This, he argues, is to leave out the melody and its beauty. In the real world there are both dead brutes and beauty, not merely together, but in organic relationship.

If the aesthetic values aimed at and achieved by the musician are the dominant characteristics of the violin solo, we understand the event only when we consider it from the Platonic point of view,

> as one in which ἀνάγκη (necessity) is the ὑπηρέτης (servant) of νόυς; or yet again to speak with Aristotle, when the event is contemplated in the light of the *end* which gives it its characteristic form.[2]

Value is not the only determining factor in actual events. If it were, monistic idealism would be the only tenable metaphysics. There is ἀνάγκη—the irreducible giveness of brute existence. But value may be the dominant factor. If the world is a telelogical organic whole, then value is logically prior to actuality and co-ordinate with being. It is real, but its reality cannot be an existence, but an *objective*, subject to acknowledgment. Value is neither a relation between a cognizing subject and an object cognized, nor a quality of things, but a unique ontological predicate like being, and related to being as what ought to be.[3]

If the "ideals of reason" are genuine aspects of reality, then the universe is an intelligible rational whole. Taylor holds that belief in the rationality of the universe is, while indemonstrable, a reasonable

[1] *Op. cit.*, p. 356. [2] *Ibid.*, p. 363.

[3] Taylor does not discuss the problem of evil adequately. His doctrine of time, however, as the becoming of what ought to be, or the ceasing to be of what ought to be (positive or negative change in value) makes it possible to avoid the simple identification of what is with what ought to be and to admit that there is a great deal that is not as it ought to be. This doctrine of time also makes impossible the sophistical denial of evil involved in the idealistic assertion that the whole is as it ought to be. The whole is as it ought to be only in the sense that reality is a purposive process becoming more fully what it is only in part; and this doctrine would hold (though Taylor does not make this point) even when the whole suffers genuine setbacks, as it may in periods of moral and cultural recession, provided only that there be significant factors striving as they ought to strive.

faith. Such a belief does not mean that the universe is wholly intelligible without remainder. It does mean, however, that the apparently irrational given can be progressively narrowed down so that in the case of an ideal intelligence other than that of the Creator, the unintelligible remainder would be functional—i.e., an ideal limit—rather than actual.

It must be remembered that Taylor includes among the "ideals of reason" the intelligible, but strictly non-logical, organizations of value in aesthetic and moral experience. He acknowledges the validity of Otto's notion of religious experience as awareness of a Wholly-Other, but says that Otto's tendency to divorce this experience from the moral and the aesthetic partially vitiates his account. As the rationality of the universe is, at the last, an article of the faith of a "reasonable," not a fanatical, rationalist, so belief in the objectivity of value is not based on final demonstration, but rests on faith in the veridicality of value judgments; and the belief that the objective system of values culminates in a Being combining absolute value and absolute being is a further step of faith.

> The notion that whereas religion makes the demand for faith in the beyond and dimly descried, morality does not, but is a matter of walking in the full daylight, can arise only when we mistakenly think of moral virtue as being nothing more than the routine practice of a set of duties which are perfectly familiar to us all, from our inheritance of social rules and traditions.[1] The life of genuine morality is always something indefinitely more than this. In truth, with every step taken toward a life of more habitual loyalty to known duty . . . we also discern new and unexpected duties. . . . Every self-surrender not only receives its reward in the enrichment of the personality we had set on the hazard, it also points the way to undreamed-of greater surrenders . . . and compliance with the new demands "costs" more than compliance with the old. The way of life does not merely begin as a *via crucis*, it remains a *via crucis* all through. The attempt to walk that road simply in my own strength is as likely to be fatal to my moral being if I make it late as if I make it early. Morality itself when taken in earnest, thus leads direct to the same problems about "grace" and "nature;" "faith" and "works," with which we are familiar in the history of Christianity.[2]

This passage has been quoted at length because it distinguishes Taylor's moralistic theism sharply from that of Immanuel Kant. Both theories rest upon faith in the veridicality of moral insight; but for Taylor, moral judgments are not merely objective, in the sense of humanly universal, but are realistic. Moreover, Taylor's profound sense of the *deepening* of the genuine moral consciousness, and its increasingly tragic cost is nowhere matched in the high-minded, but somehow pedantic, moralism of Kant.

[1] Notice the explicit repudiation of Bradley's formula which Taylor accepted in *The Problem of Conduct*.

[2] *The Faith*, I, pp. 223–24.

VI

THE TEMPORAL AND THE SUPRA-TEMPORAL

We have, then, to deal with the doctrine that real historical process depends upon eternal structure more real than temporal process.[1] Such a distinction between grades of reality can be made, Taylor argues, only upon a value basis. Passage of time, he asserts, is associated with change in value, not merely, as in classical mechanics, with change in configuration. Even in the domain of the physical, process is constituted by

> successions which exhibit pervasive "universal" characters or pattern, events in which, in the terminology of Whitehead, *objects*, that is universals *in re*, are situated, becomings which in the significant language of Plato are *γενέσεις εις οὐσίαν*. Still less is any morally significant act a mere event which happens.[2]

If values actually are, as Taylor believes, the dominant features of the real, then time, as the form of change, is not mere successiveness, but transition in value (not necessarily nothing but transition in value) in which the "not yet" and the "no longer" are distinguishable from, but in some sense integral to, the *now*. Only if this be true can an act be part of a larger pattern, which is what it must be if it be historical. Unless one instant be internally related to another, obligation for the future and responsibility for the past are meaningless. Time presents a unity-in-difference, and the difference is one of value, for the essential nature of moral process is change in value. But the unity is also one of value; the differences define a unified pattern of value being actualized in temporal process. The nature of time is thus in both its transitoriness and its continuity closely bound up with the reality of value. Becoming (temporal process) is neither ultimate, as in naturalism, nor unreal, as in absolute idealism; it is real, but not ultimate. Time is subordinate to and dependent upon eternity.

All value experience is the process of actualizing what has not previously been real; it is the coming into being of what ought to be, the doing of what ought to be done (or else the perishing of concrete value, the ceasing to be of what is good). If we already are what we ought to be—if, as the naturalist asserts, "what I ought to do is what such a system of desires (as I am) wants to do";[3] if in Kantian terms, there is no difference between "duty" and "inclination," even when they coincide—then such a view of value experience as this is

[1] Taylor argues parenthetically that his doctrine of eternity is implicit in any realistic theory of metaphysical causality.

[2] *Op. cit.*, p. 68.

[3] D. H. Parker, *Human Values*, p. 29.

patently absurd, or at the very least, emotional and symbolical. But if, as Taylor argues,

> we will not merely that the course of things shall be different, but that we ourselves shall be different,[1]

then we are willing genuine change impossible to a creature wholly temporal and unnecessary to a being wholly eternal.

In his essay, "The Vindication of Religion," Taylor makes a slightly different point:

> Whoever says "ought" meaning "ought" is in the act bearing witness to the supernatural and the supra-temporal. . . . Only to a being who has in his structure the adaptation to the eternal can you significantly say, "You ought."[2]

Taylor's statement of the realistic moral argument for the eternal nature of the self, and hence the eternal reality of the value-charged universe, presents the full axiological argument at its best, not the Kantian truncated form of the moral argument which brings in deity and eternity as necessary mechanism for an external balancing of the scales of cosmic justice. Man's moral life is explicable only as a response to a supra-human supernatural reality. As man responds, moreover, he shares in the goodness of this transcendent reality; he is thus not merely what he (naturally) is, but is also what he (ideally) aspires to. His morality is not merely instrumental to other values; it is itself an ideal achievement. Life, to the moral hero, is more worth-while, more interesting, more valuable than is even the best life of the purely natural man—a theme which Taylor repeats in his last book, *The Christian Hope of Immortality*. It is good in itself to be courageous and unselfish; to be so is to begin to enter into the *joy* of the Lord. "What is the chief end of man?" asks the Shorter Catechism, and answers: "The chief end of man is to glorify God and enjoy Him forever." All moral experience thus finds its sanction in supratemporal moral standards. Moreover, moral experience actually demands progress toward, and ultimate participation in, absolute good. To be satisfied with a personality less than the best, as John Laird has said, is to be less than moral. Hence morality demands eternity, not as a reward (as Kant weakly conceded to the Utilitarians) but as a compresent condition of its own rationality. Here is another form of the ontological argument.

Moral experience then, taken seriously requires an object itself good, complete and whole, so that in possessing it we are possessing that which absolutely satisfies the heart's desire and can never be taken from us.[3] If the moral effort of man is veridical and is not

[1] *The Faith*, I, p. 146. [2] *Essays Catholic and Critical*, pp. 61 and 63.

[3] Taylor was, of course, a Christian. Echoes of the language of the King James' Bible and the Book of Common Prayer occur all through his writings.

doomed *ab initio* to frustration, then the possession of the supreme good must be *final.*

We must be able to look forward to the supreme good, and to having it in perpetuity. But in such fruition our own being would have been lifted above the level of successiveness; we should ourselves have passed from temporality to eternity.[1]

Hence morality must be in its innermost essence "otherworldly."

VII

VALUE AND GOD

Absolute eternal good is the end of human aspiration. It is also the

source and sustainer of the aspiration by which man puts off his first merely self-contained and temporarily confined self-hood. God, that is, to use language technical in the thought of Christianity, must be conceived not only as Creator, but as Redeemer and Sanctifier.[2]

Since man is a *moral*—i.e., a *free*—agent, he can be "converted" only of his own free will; and yet, if he is to rise above temporality, the impulse must come from without. The Augustinian solution of the problem, which Taylor accepts, is that

God Himself is the *lumen intellectus.*[3]

This, Taylor argues, is

The only solution of the difficulty. . . . We know our true good, which is no other than God Himself, by obscure, but none the less real and impressive personal contacts with God. Without this real contact with the eternal, the process of winning a true personality could not be begun. . . . From its humblest beginnings that (the moral) life is, at every step, one of transformation into the likeness of that which we contemplate.[4]

Taylor's axiological argument for theism in a sentence is this: The nature of temporal value experience is such as to be explicable only upon the assumption that it is grounded in a non-temporal, perfect Being, the most real of beings, the absolute and primary source of actuality, and the most perfect of beings, so good that none better can be conceived.

This pushes the problem of the relation of value and being back one step further, placing it in their common source, God. To speak of God as the source of being is, of course, paradoxical. God must be to be the source of anything. It is absurd to characterize anything as its own source. God, Taylor holds, is the source—the cause—of all

[1] *The Faith,* I, p. 105. Taylor does not press the point, but the same argument holds for the intellectual search for truth and the aesthetic desire for beauty. This is an *axiological,* not a merely moral argument.

[2] *Ibid,* pp. 233–34. [3] *Ibid.,* p. 238. [4] *Ibid.,* p. 239.

being other than Himself. In the same way, God is good by nature. His goodness is not the cause or source of His own good activity, but is the cause—the reason for, the referent, the criterion of measurement—of all other goodness. The relation between the complex of finite goods and the absolute good of God is analogous to the relation between the causal network of finite beings and God's being as the final cause.

Goodness is related to being as what ought to be; to say that God is as He ought to be is not to assert that there are antecedent or external conditions determining what or how God ought to be. God conforms to no form or pattern superior in meaning to Himself, either in His being or in His creative activity. In terms of scholastic theology, God's will is free, but since it is good, not capricious or arbitrary. God is His will, *Deus est suum velle.*

> When once we understand that this distinction (between God and His will) can have no place within the being of God, it seems to make no real difference whether we say that God produced creatures by an act of free will, or, with Spinoza, that he produces them "by the law of his own nature," since in God, who is the absolute *prius*, there can be no distinction between *Deus* and *deitas*, such as there is in us, who are always *in fieri*, between the man and the humanity he is ever "putting on" but has never fully put on. . . . My objection to Spinoza's formula would be based not on what it asserts, but on what it denies. It asserts, truly as it seems to me, that God acts "by the law of his own nature," but falsely sets such action in God in opposition to "free action," as though the complete identity of *voluntas* and *natura* were not itself the very ideal of perfect freedom.[1]

In this distinction Taylor is clarifying a problem that has plagued Christian thought from patristic days, the problem of the relation between God's will as ultimate cause and His will as final standard. It is one thing to say that all things are in consequence of God's will, if by will we mean complete and uninhibited expression of character, and another to say that all things are by arbitrary fiat.[4] The latter doctrine, Scotism, eventuated among the Scholastics in the assertion that good is good because God wills it, and even, with William of Occam, that God might have willed otherwise, so that the content of the moral law might have been the opposite of what it is. Jonathan Edwards came very close to this conception when he said in his sermon, "Sinners In The Hands Of An Angry God," that only God's mere will—i.e., His arbitrary choice—keeps the elect from their just deserts. This lack of justice, Edwards implied, is not only pleasant for the elect, but is part of God's goodness.

The Scotist-Calvinist doctrine really reduces value to being, for, like the Moslem preoccupation with sovereignty, it recognizes no value standard at all. The Thomistic doctrine that God's activity is the expression of His nature seems at first glance also to reduce value

[1] *Op. cit.*, pp. 245–46.

to being, but it does not really do so, for *natura* is not simply an existential concept. God's goodness is not accidental but integral to His nature. It is axiomatic that an efficient cause must be of the same mode of being as its effect. An idea cannot move a stone unless the idea is embodied. A First Cause cannot create value unless value is inherent in the First Cause. If goodness does characterize the Source of actuality—if It is as It ought to be, then goodness is an element, and perhaps the dominant element in the being of the First Cause.

Another way of stating Taylor's axiological argument for theism is this: The concept of value is the most ultimate of explanatory principles. In its supreme form, absolute value, though it does not give rise to existence, nor to any particular value (the concept is not simply moral, but axiological), it is inconceivable without its correlate, absolute being. It is, therefore, the *raison d'être* of temporal actuality, for unless value be presupposed, no reason can be assigned for being taking the form of temporal actuality. In the one instance, therefore, of that absolute reality which is the ground of all other reality, *to be* and *to be valuable* are one and the same thing. Finite beings never quite are—i.e., are never absolutely real—because they do not contain the reason for their being solely within themselves. The reason for the universe must be a reason that is its own justification, a being such that *to be at all* and *to be its own reason* are inseparable co-implicates. Objective value in the universe presupposes, therefore, a Being in Whom absolute value and ultimate being are but two aspects of one reality.

Taylor's axiological argument for theism is thus a re-statement of the Platonic-Aristotelian-Scholastic doctrine that value is objectively real and that the sufficient reason for a value-charged universe must combine in itself goodness and being. It is consciously and intentionally pre-Kantian in orientation. It differs from Whitehead's essentially objectivistic axiology in insisting on the being of God and emphasizing His transcendence. It is realistic as contrasted with Hartmann's idealistic concept of value as essence. Good is not only, as Hartmann asserts, What-Ought-To-Be; it *is*, hence is a determinant of process. Hartmann, conceiving the problem in Scotist terms, sees "a radical and rigid contradiction,"[1] between the absolute claims of moral values and metaphysical theism. The realistic axiologist, however, may point out to Hartmann, that it is no more a derogation of God's being to assume that He is moral than to assume that He is rational. While God's being transcends finite rationality, infinity does not drive the rational theologian to the *Neti! Neti!* of Hindu absolutism. If being and goodness are ultimate co-ordinate predicables, then their relation can be internal to God's integral being.

[1] Hartmann, *Ethics*, Vol. I, p. 266.

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THE NATURE OF PHYSICAL SCIENCE AND THE OBJECTIVES OF THE SCIENTIST

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The history of Western Thought since the seventeenth century leaves little doubt as to the practical validity of the method of natural investigation discovered by Galileo, interpreted by Descartes, and variously generalized by Newton and Einstein. The repercussions of its success on every level of human activity, religious, political, commercial, and educational (to mention only the more obvious ones) have awakened the most diverse and even contradictory speculations as to the nature of this science and the objectives of the scientist. Often enough one gets the impression that these speculations are founded on an arbitrary and unjustifiable conception of the nature of modern science; a conception formulated in terms of what one thinks or wishes to think science is from its effects upon the extra-scientific domain (which, in this context, includes philosophy) rather than in terms of a patient and critical penetration of its intrinsic structure.

A limited and admittedly inconclusive experience suggests an enlightening, if not always exciting and inspiring, exercise in critical analysis into the nature and validity of scientific knowledge and the objectives of the scientist in a democratic society. The purpose of this paper is to suggest the typical features of this exercise and the critical insights it yields.

Physical science is, from this point of view, most readily analysable in the specific operations of the physicists. But such is its complexity and high specialization that there are few, if any, physicists equally competent in all its essential operations. Accordingly it is convenient to classify them into experimentalists, theoreticians, and criticists, and then to investigate the specific functions of each. Ideally and historically one may of course be any one of these without being the other, but, from the point of view of the science of physics, all are required. As a first approximation, therefore, we may describe physics as the integrated product of the collective operations of the three types of physicists. If we relate these types according to the decreasing density of their population, we find the experimentalists most numerous, then the theoreticians and finally the criticists. This superficial feature is connected undoubtedly with the ascending order of generality and synthesis which characterizes the specific operations of the three types. In this connection, we may say that the experimentalist is closer to tangible, concrete nature; the theorist, one step removed from the experimentalist, depending

as he does upon the data provided by the latter; and, finally, the criticist, a step removed from the theorist depending, in his turn, upon the results achieved by the theoretician. In fact, of course, the relations between these three types are not so nicely unidirectional as will become clear when we consider their typical functions in operation. To know the nature of physical science then we must consider in greater detail the essential notes of each of these fundamental types of physical operations, namely, the experimental, the theoretical and the critical.

Consider first the experimentalist: his primary function is to expose and verify new data or to describe more precisely data already discovered. Along this line, he seeks not only to extend our objective knowledge of the external universe of common sense experience but also to probe beneath its apparent surface. The results of these systematic and experimentally controlled investigations are averaged and expressed in symbols readily communicated or understood because of their objectivity. In the most general terms this objectivity consists in the complex knowledge and skill to construct, apply, read and interpret instruments of measure. How else is it possible to produce data which can be duplicated and verified in approximately identical terms? This typical experimental procedure is sometimes designated the method of controlled quantitative analysis, and consists substantially in substituting for the content of the immediate incommunicable sensations of the individual physicist the significant readings of instruments which are not only more sensitive to certain changes in the space time continuum of events but also less subjective than our immediate and unaided sense perception. It is noteworthy that such instrumental procedures are, like the senses for which they substitute, instruments of identification or observation, but, unlike the unaided senses, they are artificial rather than natural instruments. By exploiting certain regularities initially observed by the unaided senses, these procedures enable the experimentalist to focus and reduce the bewildering qualitative differences presented in spontaneous sensation to relatively simple space-time differences registered on instruments. Thus, the ordinary mercury thermometer exploits the more primitive and direct observation that heat expands solids and substitutes for our tactual perception of heat the visual perception of the coincidence of the surface of the mercury column with one of the graduated markings on the tube. In this way, the experimentalist, by a process of substitution, translates the qualitative richness of direct perceptual data into more-or-less quantitative terms. The qualification "more-or-less" is especially pertinent here as it is intended to indicate that the numbers provided by experimental procedures are concrete rather than abstract or arithmetical and consequently possess the curious advantage of con-

veying a physical meaning in a mathematical form. As concrete or physical numbers they involve a twofold reference not involved in arithmetical quantities: first, their meaning and content are inseparable from instruments which can never achieve an absolute precision, and second, the personal errors of the observer who records them are inescapable however refined the statistical procedures which permit some substantial practical control over such personal factors. A reliably complete exposition of the more typical features of the experimentalists' operations should not ignore the fact that, at least in classical physics, the most irreducible measures of distance and time involved the unverified assumptions of the existence of rigid bodies and simultaneous events.

We might appropriately note here that the substitution of indirect or mediate observations through artificial instruments for the direct observations of the senses does not necessarily imply, as some philosophers and scientists would have it, that the special senses are purely subjective but only too subjective to be physically useful and reliable. By the use of instrumental procedures, the experimentalist, in this connection, simply passes from the psycho-physiological relativity of uncontrolled sense experience to the physical relativity of controlled scientific experience.

Finally, with the exception of the more primitive ones, physical instruments are themselves complicated structures, the use and significance of which are determined quite as much by theoretical considerations as by experimental requirements. As a result not even a good technician to-day may establish himself on the unshakable solidity of the so-called brute fact. Anyone of normal sensibility may detect the rate of ticks of a Geiger counter, but to interpret its physical significance, a considerable knowledge is required which is quite as theoretical as experimental. In a word, to-day experimental data is so loaded with theoretical references that, though the experimentalist need not be a theorist, he must know the results of pertinent theories.

To summarize, we may recall that the experimentalist appears to be concerned chiefly with the accumulation and specification of data; that these data are expressed in the concrete numbers furnished by instruments of measure or mathematical operations upon such numbers; that a physical object, as distinguished from a pre-scientific sensed thing or event, is described by enumerating the significant readings of the instruments through which it is observed. Inescapably, such a method, though in varying degrees, isolates from the pre-scientific context factors which are not isolated in the context itself. Prior to this instrumental isolation or scientific selection, the experimentalist stakes out or selects that part of the immediately given context which he wishes to study. In this sense,

he controls space-time reality quite as much as it controls him. Even on the experimental level, whether or not the experimentalist avert to them, these selective operations are always operative and determining. Between the laboratory and nature-in-the-raw, there is a gap which, because of its selective operations, experimental science can never fully close.

It is not without interest to note, parenthetically, that the conditions which limit the selective operations of the individual experimentalist are usually specified by others though, initially, by some one individual. To be physically significant, such selected data, as already pointed out, must be susceptible of repeated verifications. In consequence, there is an indispensable cumulative character in the control and interpretation of experimental data. Within the limits of brute matter, on the one hand, and the method of controlled quantitative analysis on the other, the possibilities of progress on the experimental level appear to be unlimited. Instruments and the conditions of their application appear to be susceptible of unlimited improvement or variation. But the conditions of such a progress is just that historical and traditional co-operation and communication which have given rise to the international community of scientists which is sometimes misconstrued as a voluntary association of world citizens. Though one may voluntarily join this community, once admitted one may not voluntarily alter the inner necessities of the community itself. These inner necessities arise in the first instance out of the nature of the operational procedures of physical science itself. Even in its external social dimensions, physical science appears to be essentially relative.

To return to the narrower limits of strictly experimental operations, and, at the same time, to correct a possible misconstruction of the role of the experimentalist, as exposed thus far, let us consider another and yet more significant part of his work, namely, the discovery and formulation of the constant relations which appear between the isolated measures with which he describes nature. The expression of these experimentally observed relations in appropriate conventional symbols constitutes an empirical law. Obviously such laws are no more necessary and absolute than the terms or data between which the relations which they express are observed to occur. If historically one may point out instances of apparently pure empirical laws, actually physical science has reached such a stage of formulation and construction that it seems doubtful whether any such purely empirical law exists. For in addition to being data and, as such, discoverable by the experimentalist, these empirical relations provide the point of departure of physical explanations or theories. In consequence, they acquire a theoretical reference which gradually becomes all but inseparable from their empirical meaning.

Physical laws, therefore, are apt to be considerably more complex in meaning that they appear in their initial experimental formulation.

At least three different but connected concepts of law appear in contemporary science. At the empirical level, as noted, a law may appear to be no more than the conventional formulation of a constant relation observed between the distinct properties of a system. In this sense, Ohm's law or the laws of chemical reactions appear to be no more than the statements of observable relations between the readings of different instruments applied, under suitable conditions, to a selected area of events. As strictly experimental, such laws simply summarize the evidences of experimental investigation to date. As experimental, they simply state a fact without assigning any reason for the fact. They state that there does in fact exist such a relation between a given set of measures that any variation in any member of the set is found to involve a proportionate variation in the other members. In this strictly experimental sense, we may formulate the meaning of a physical law as follows: if a cause, with which the law is completely unconcerned, modifies one of the terms (magnitudes) in the observed relation expressed by the law, then, the quantitative value of the other terms is found to be modified. And if one of the terms of the relation is the measure of time, the law will simply state that the other measures vary in function of the time measure and nothing more. In this sense the law may very well state that an antecedent precedes a consequent but not because it is the antecedent in the causal sense. In short, on the strictly experimental level, physical laws do not appear to express causal relations, and, accordingly, do not constitute adequate grounds by themselves for firm prediction.

A more complex and usual sense of the concept of law is apparent when we observe that the theoretical accounts of such experimental regularities introduce into their meaning an extrinsic formal or structural relation which makes possible the unification or synthesis of the laws themselves. In this context, an experimental law acquires a meta-empirical and more universal validity so that it refers not only to all observed past events but also to all observable future events within this theoretical frame. In this sense, an experimental law is additionally the logical consequence of certain theoretical postulates. Sometimes the postulates themselves from which the experimentally observed laws may be deduced are called laws. The law of universal gravitation is a case in point. From the physical point of view this appears arbitrary and probably arises from the fact that the postulates are suggested by the laws which they are invented to explain. Since the observed laws are more or less constant relations between experimental quantities, it is not surprising that the postulates, proposed to explain them, should take the form of

more general relations between the most fundamental magnitudes. Nor is it surprising that such postulates should be quite as relative as the empirical laws which they explain. Our concern at this point, however, is rather with the consequences of the theoretical postulates than with the postulates themselves. For these consequences are, at least in part, susceptible of experimental verification, and correspond to the laws which the postulates are proposed to explain. In this context, physical laws are impregnated with theoretical references in virtue of which they may be said to be causal. This, I think, is the concept of law which provides the firm and habitual basis of scientific prediction as it is exemplified most strikingly in Newton's law of universal gravitation or Einstein's law of the conservation of mass-energy. The causes, however, implied in these laws are logical or possible causes constructed and not found by the physicist in the postulates of his theories. On the basis of the experimental evidence of which he disposes, they are the most *convenient* substitutes conceivable by the theoretician for the real causes in nature.

In a yet wider context, on the strength of the repeated verifications of laws both in the experimental and quasi-theoretical sense, the spontaneous prescientific conviction in the constancy and harmony of nature is strengthened and there emerges the most general concept of law as "the essential connectivity" of natural events, to use the suggestive terminology of Bridgman. In this sense, the concept of law seems to have a reference to much more than the postulated or possible causes of physical theory: its reference is to the real cause or causes operating in external nature, causes which transcend and are presupposed by the specific operations of physical science. Such a concept is not susceptible of strictly scientific, in the physical sense, formulation and lies at the roots of the intelligibility of nature and man alike.

Inevitably the analysis of the experimental meaning of physical laws involved us in a reference to physical theory, the domain of the theoretician, in which alone its complete meaning may be articulated. Accordingly, we turn now to a general analysis of the characteristic operations of the theoreticians. As already suggested, the materials with which the theorist works are largely provided by the experimentalist, but the forms are, in part, provided by the mathematician.

There is a grave danger of misrepresenting the nature of physical theory to-day as a result of misconstruing the sense of its mathematical structure. By emphasizing the experimental origins which inspire as well as confirm the theory, it is possible to avoid this misconstruction. In physical science, a theory appears to be related to experimental laws in a way closely analogous to the way in which the laws are related to the isolated measures which they relate. In other words,

just as a law in physical science expresses in the form of a general algebraic relation a relational property of isolated scientific facts, so a theory expresses a general relational property of isolated laws. The theory synthesizes or unifies the apparently unrelated laws by implying them in a postulated relation or equation from which they may be mathematically deduced as consequences. The terms of such a postulated equation must, at least in the principal part, be physical terms (as distinct from pure mathematical terms) and as such susceptible of physical specification and indirect verification. This possibility of physical specification is equivalent to what Bridgman, if I understand him correctly, has called the indispensable text of every physical theory.

"Suppose," he writes, "that I am presented with a set of equations by the theoretical physicist which he tells me contains the theory of the phenomenon in question. In checking this statement, that is, in attempting to apply the equations, I discover at once that the equations are only part of the story. The equations always have to be accompanied by a 'text' telling what the significance of the equations is and how to use them. Thus if I set up the mathematical theory of a body falling under the action of gravity, I have the equation

$$dv/dt = g$$

but I have to supplement this by a 'text,' saying that 'v' is a number describing a property of the moving body which can be obtained by a certain kind of measurement, etc. The equation then determines by integration or other mathematical operation a system of numbers. For example the equation above gives by integration

$$v = gt + v_0 \qquad \text{or} \qquad s = \frac{gt^2}{2} + v_0 t + s_0.$$

What I mean by saying that the equations contain a theory of the falling body is that numbers obtainable by the physical manipulations stipulated in the text satisfy the equation when substituted into it. Not only must the text describe the nature of the measurement, but it must also specify the connection between the different symbols in the equation. Thus in our simple example the text specifies that the 's' and the 't' are the distance and time obtained by *simultaneous measurements*. The equation itself has no mechanism for demanding that 's' and 't' be simultaneous, and in fact this demand cannot be described in the language of the equation."[1]

Physical theories, in general, are of two types: the mechanical model theory and the mathematical model theory. It should be noted

[1] P. W. Bridgman, *The Nature of Physical Theory*, Princeton University Press, 1936, p. 59.

that these are not mutually exclusive so that the mechanical model type may be included as a special case of the more general mathematical type. The mechanical theory consists essentially in imagining and constructing a mechanism, the motion of whose parts are analogous to phenomena observed in nature. Such a theory corresponds to the type implied in a well-chosen metaphor of Einstein and Infeld: "In our endeavour to understand reality we are somewhat like a man trying to understand the mechanism of a closed watch. He sees the face and the moving hands, even hears its ticking, but he has no way of opening the case. If he is ingenious he may form some picture of a mechanism which *could* be responsible for all the things he observes, but he may never be quite sure his picture is the only one which could explain his observations."[1]

Not only is it possible to find a mechanistic explanation of any physical phenomenon but, as Poincaré has pointed out, the number of such explanations for a given phenomenon is infinite. The value and importance therefore of the mechanical model theory are not that it gives or even could give an exact representation of the real nature of the natural phenomena it proposes to explain but rather that it offers a convenient and coherent unification of the quantitative relations observed in nature as well as an appropriate analogy in which to describe them.

In modern physics, the mechanical model has been largely supplanted by the mathematical model as the result of new experiences which are so far removed from ordinary experience that the investigator is unable to find in them the counterpart of any of the objects of ordinary experience. At least one requirement must be met in a physico-mathematical theory which need not be met in a purely mathematical theory: "that it should provide the tools for calculating the behaviour of the physical system which it is constructed to explain, and it is capable of doing this if there is correspondence between those aspects of the physical system which it engages to reproduce and *some* of the results of the mathematical manipulations."[2] Unlike the mechanical theory then, the mathematical theory may and does involve symbols which have no physical counterparts. Accordingly, in this type of theory, the explicit and independent operations of the theoretical intelligence become discernible and the physicist may become more clearly aware of the intrusion of the theoretical intelligence in his account of the universe. We say "may" here by way of acknowledging the tenacity with which some critics of physical theory, even at the level of modern mathematical physical theories, still cling to the belief that these operations are reiterative of space-time reality itself. Bridgman describes this

[1] A. Einstein and L. Infeld, *The Evolution of Physics*, Simon and Schuster.
[2] P. W. Bridgman, *op. cit.*, pp. 65, 66.

belief that all the steps in a mathematical theory must have their counterpart in the physical system as "the outgrowth of a certain mystical feeling about the mathematical construction of the physical world. Some sort of an idea like this," he continues, "has been flitting about in the background of the paraphernalia of the thinking of civilization at least since the days of Pythagoras, and every now and then, perhaps after some particularly striking mathematical success, it bursts forth again like a crop of mushrooms after a rain, as in the recent fervid exclamation of Jeans that 'God is a mathematician.' This mystical feeling involves, I think, a feeling for the 'real existence' of principles according to which this universe is run. We have seen how meaningless is the contention that principles exist independent of the mind in which they are formulated. What Jeans might have said is that man is a mathematician, and reflected that it is no accident that he forms nature in his own image."[1] I am not so sure that Bridgman's account would be any more acceptable to many than was Jean's account to him. Be that as it may, it remains that on the level of physico-mathematical theory, proper interpretation involves something considerably more than what, not so many years ago, would be admissable in physical science. As physics has become more conscious of its own most successful procedures it has become more modest as to the absolute significance of its results.

In themselves, physico-mathematical theories may make no serious claim to expressing the universe of nature as it really is. They prescind entirely from the problem of "real existence" which transcends their specific competence. Their unique rôle is to synthesize *experimental* data in such wise that from their principles may be deduced as logically necessary consequences verifiable quantitative relations. At most, they present a possible, though not necessarily imaginable, picture of existing nature as it exhibits itself mediately in actual or possible experimental observations. On these grounds, Eddington's designation of the "physical universe" as the *theme* of physical science has much to recommend it.

"Physical knowledge (as accepted and formulated to-day)," he writes, "has the form of a description of a world. Effectively therefore the physical universe is defined as the theme of a specified body of knowledge, just as Mr. Pickwick might be defined as the hero of a specified novel.

A great advantage of this definition is that it does not prejudge the question whether the physical universe—or Mr. Pickwick—really exists. That is left open for discussion if we can agree on a definition of 'really exists,' which for most persons is a parrot-phrase whose meaning they have not troubled to consider. The few who have attempted to give it a definite meaning do not always agree

[1] P. W. Bridgman, *op. cit*, p. 67.

on the meaning. By defining the physical universe and the physical objects which constitute it as the theme of a specified body of knowledge, and not as things possessing a property of existence elusive of definition, we free the foundations of physics from suspicion of metaphysical contamination."

We need not be unduly distracted by the transparently predetermined conditions with which Eddington here envelopes the meaning of real existence, which, by his own admission, is extra-physical, in its deepest intelligibility. But, on the strictly theoretical level of scientific physics, we may confidently concur that the "observed universe" with which physical theories are concerned is really the universe of scientific items provided by conventional experimental procedures as distinguished from the real universe of obscurely distinguishable things and events immediately apprehended through our unaided senses—the wider universe, that is, which is the stage of all human and natural activities; the universe which, though unintelligible from the strictly physical point of view, is more intelligible in itself, providing as it does the initial and final point of reference without which physical science itself collapses. If a growing and sobering awareness of the limitations of his specific operations has convinced the physicist that the problem of existence or reality does not concern him as physicist, it has not convinced him that he must face it on other grounds. If man were just a mathematician perhaps the problem would be less intrusive, but, as he is, the problem intrudes into all areas of human thought to the extent that we might with confidence describe intelligence generally as the faculty or power which seeks naturally the meaning of existence.

Relativity theory and quantum mechanics made explicit a factor which was always implicit but hitherto unrecognized in every physical theory—namely, the inner necessities of the intelligence which constructs the theories on the basis of the data provided by controlled experience. At this point, the critical or evaluative phase of scientific activity became a part of physical science itself rather than a luxurious and superfluous speculative exercise as the epistemological inquiries of a Mach or a Poincaré had appeared to some of the more earthy members of the scientific community. But at this point physical science departed its own domain into the realm of philosophy where, understandably enough, it has not felt entirely at home. Eddington has described the sentiments of the scientist beholding himself in the mirror of philosophy. "Theoretical physicists, through the inescapable demands of their own subject have been forced to become epistemologists, just as pure mathematicians have been forced to become logicians. The invasion of the epistemological branch of philosophy by physics is exactly parallel to the invasion of the logical branch of philosophy by mathematics. Pure mathema-

ticians, having learnt by experience that the obvious is difficult to prove—and not always true—found it necessary to delve into the foundations of their own processes of reasoning; in so doing they developed a powerful *technique* which has been welcomed for the advancement of logic generally. A similar pressure of necessity has caused physicists to enter into epistemology, rather against their will. Most of us, as plain men of science, begin with an aversion to the philosophic type of inquiry into the nature of things. Whether we are persuaded that the nature of physical objects is obvious to common sense, or whether we are persuaded that it is inscrutable beyond human understanding, we are inclined to dismiss the inquiry as unpractical and futile. But modern physics has not been able to maintain this aloofness. There can be little doubt that its advances, though applying primarily to the restricted field of scientific epistemology, have a wider bearing, and offer an effective contribution to the philosophical outlook as a whole.

Formally we may still recognize a distinction between science, as treating the *content* of knowledge, and scientific epistemology, as treating the nature of knowledge of the physical universe. But it is no longer a practical partition; and to conform to the present situation, scientific epistemology should be included in science. It is a field in which philosophy and physics overlap."[1]

The Kantian form in which he expresses his insight need not blind us to the essentially philosophical character of Eddington's insight. Science, in the restricted sense in which we have considered it, reaches beyond itself in order to know itself. In the process it is confronted with values of another order to which its successful procedure are no longer applicable. In this order scientific isolationism has become quite as impractical as political isolationism. In this order, the scientist is confronted not only with the objectives of science but with the objectives of scientists.

The question of the aims of science has become, at least in the practical order, inseparable from the aims of the scientist, a question which somehow involves the wider issue of the aims of man. The answer to the first question may involve a tedious analysis, of which the broadest features I have tried to suggest in this paper, but issues eventually in that self-knowlege of the criticist out of which grows the broadest issue of the objectives of the scientist in society. The critical operations of modern science in themselves are not science according to any of its traditionally recognizable features, but rather philosophy and accordingly must be studied by methods appropriate to the inner necessities of this discipline. Materially, scientific epistemology belongs to physical science in the sense that the data and operations analysed are those of physical science. But formally, it

[1] Sir Arthur Eddington, *The Philosophy of Physical Science*, 1939, pp. 6–7.

belongs to philosophy since what is sought are the nature and limits of those data and procedures. The object of such a critical investigation therefore is not merely the structure of science but also the mind or intelligence which erects the structure. The structure is always relative and never complete but the architect of the structure remains identical to himself throughout the interminable search into the problems of the measurability and control of natural forces.

If, in its origins, classical physics, for practical and historical reasons, abandoned the search into the real nature of things; in its development, it often forgot this prudent restriction, enunciated by Newton, and mistook its own creations for these forbidden natures. Positivism is still very much alive. And in doing this, the individual scientist was responding to an impulse or instinct which is prior to and greater than the scientific impulse. At length, the inner necessities of his own creation have forced him to transcend the artificial limits established by the originators of modern science. He has become, for better or worse, in part a philosopher. And, shockingly enough, he has and must become a philosopher in order to understand his own science.

This situation has not failed to elicit undiscerning and self-righteous invitations or solicitations of the scientist to enter upon the more solid grounds and brighter horizons of philosophy. But he need not be lured from without where he might more surely enter from within. If the effort to substitute science for philosophy has failed so also, it must be admitted, has the effort to ignore science. It is difficult to see how a living philosophy may stand aloof—reconciled apparently to an appalling ignorance of the vastly detailed, technical and complicated structure of modern science whose demonstrable success has conferred upon its architects the irksome glory and heavy responsibility of keeper of the arms in this bewildering and divided world. The scientist, who is perfectly conscious of his rôle, like the prodigal son of old, in spite of himself, is returning to his father's house. In short, at the critical level, scientist and philosopher alike have much to offer one another. For, if the physicist can no longer, except perhaps as a highly skilled technologist, ignore philosophy, neither can the philosopher, except perhaps as an historian of some specific doctrine, ignore science. To understand not only their own sciences but, much more importantly, to understand the universe of which those sciences are the intelligible account to date, each needs the other.

It is this mutual need, as yet only vaguely understood and not widely grasped, which underlies, in part, the crisis in our contemporary education. For, granting the desirability of meeting the need the question naturally arises how can it be met. The average individual does not live long enough, given the organization and ill-

defined aims of contemporary education, to become informed, to say nothing of formed, in both science and philosophy. At present, specific training in either field employs techniques and methods which beget specifically different habits of thought and hardly transferable insights. In consequence, some scientists have tended, in response to the necessities of their own advancing science, to philosophize without benefit of a sufficient formation in philosophy, and some philosophers have attempted to interpret science without understanding its intrinsic nature. Instead of integration, this situation has produced disintegration with the dismal result that those who have achieved the greatest control over nature appear to know the least about nature in itself. History appears to have summoned the scientist from the splendid isolation and genteel association of the laboratory and the scientific community into the seething forum of human events of which physical science in operation is but a small fragment. If matter yields its secrets in part through atomization and quantization, man does not. The comfortable illusion that nature can be explained in uniquely scientific terms has been exploded by science itself.

I think we may conclude then with the suggestion that the nature of science and the objectives of the scientist may not be grasped outside of a philosophical perspective to which science itself leads. To elaborate these objectives requires something more than a knowledge of physical science—a something more which our educational programme as presently constituted does not provide.

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MATHEMATICAL FORMALISMS AND THEIR REALIZATIONS

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In a short article, published in an earlier volume of *Philosophy*[1] under the title "Philosophy and Mathematics," I tried to explain the current conception of pure mathematics as the study of abstract structure by construction and elaboration of appropriate axiomatic formalisms. In the present paper I propose to consider certain philosophical problems, of interest to philosophers and mathematicians alike, which have their origin in the relation between such formalisms and any applications to experience that they may possess. Consideration of problems of this kind is no new undertaking, and in Reichenbach's *Wahrscheinlichkeitslehre*, for instance, a considerable amount of space is devoted to the *Anwendungsproblem* or problem of application of the formal calculus under consideration. Most such discussions, however, are at bottom an appendage to an account of the formalism itself, and the author's interest is primarily mathematical. The result is that the philosophical issues involved are not given due weight; and it is these philosophical issues that I wish to discuss in the present paper.

The object of study in any branch of pure mathematics is an abstract structure, or set of relations between one or more classes of entities. It is abstract in the sense that the actual nature of both the entities and the relations between them does not need to be specified. We need to know, at any rate in some instances, whether particular relations hold between particular entities of the class under consideration, and we need to be able to infer new relationships from those already known, but the knowledge can remain purely formal and abstract. Thus arithmetic, for example, can be treated as the theory of a set of symbols or counters, labelled 1, 2, 3, . . . , which can be combined in certain ways and between which certain specified relations of order can be asserted to hold, and it has been treated in this manner by Peano. The structures studied in mathematics are all very simple from the point of view of logic, since they can be defined completely by a small number of primitive propositions or axioms, from which all their other properties follow deductively. If they were not simple in this sense they would not be amenable to the methods of investigation that have been evolved by mathematicians.

A *formalism* then, as we shall call it from now on, is a mathematical exposition of the properties of a class with a given structure; and in it every theorem is proved by strict deduction, the ultimate premisses

[1] *Philosophy*, XXII, 1947, pp. 231–39.

being the axioms on which the formalism is founded. The theorems belonging to it hold for every concrete system which satisfies the axioms, or in other words, every such system possesses the structure described by the formalism. Such a system may be called a *concrete realization* of the formalism. All realizations of one and the same formalism are isomorphic, in the sense that they can be fitted to one another so that their structures correspond exactly; and the formalism can be thought of as derived from the set of all its concrete realizations by abstracting from everything except the common structure concerned.

The classical formalisms of mathematics have, as a matter of historical fact, been evolved by an actual process of abstraction. Although their formulation in completely abstract terms is comparatively modern, many of them have been known in a recognizably mathematical form for so long that their origins are now lost. Thus we can only conjecture, for instance, at the earlier stages in the evolution of the formalisms of arithmetic and geometry, which are already highly developed in the *Elements* of Euclid. There are other branches of mathematics, however (e.g. the theory of probability) which have only taken shape in modern times, and so we do possess some historical examples of the evolution of a formalism.

The history of thought of a civilization shows a continual increase in the degree of organization of experience, as more and more order is detected in phenomena and new relations are found to hold between them. At the most rudimentary level this detection of order takes the form of empirical observation of regularities (the first step towards scientific explanation) but later on, when the empirical data are sufficiently numerous and well-organized, whole bodies of knowledge are seen to possess structures which can be isolated and are treated mathematically. It may happen that an already familiar formalism will fit; but if this is not so it may be worth while to construct a new formalism and to study it from the point of view of pure mathematics. An instructive illustration of the latter state of affairs is furnished by the theory of probability.

Mathematics itself is continually growing, both through incorporation of fresh formalisms, abstracted from new branches of scientific inquiry, and also by its own inner development. When a formalism has become accepted as a part of mathematics it is studied for its own sake, and entirely new ideas are often suggested by attempts to solve purely mathematical problems which arise either within the formalism or at its points of contact with other mathematical formalisms. Thus mathematics is enriched by new formalisms drawn from concrete experience, and it also itself provides ready-made formal results for which concrete realizations may afterwards be sought outside mathematics. This two-way interaction between mathe-

matical speculation and organization of experience has important consequences when we consider the problem of application or, as we may now call it, the problem of relating a formalism to its concrete realizations. But before discussing these implications we should perhaps make the notion of realization more precise.

Showing that a formalism has a certain realization means exhibiting the structure which it describes as the structure of some concrete system, i.e. of some portion of experience. Two things, therefore, are required: (*a*) the formalism, (*b*) an organized body of experience. The character of the formalism has already been described in general terms, and is familiar to everyone who has studied mathematical textbooks, but we still have to say something of the body of experience that is to provide the realization.

It is plain that no body of experience can provide a concrete realization of a formalism if it is unorganized; for to do so it must possess a structure, even though this structure is non-formal in that it arises from specific relations between concrete individuals. Before we can say whether a suggested realization is valid (or possibly valid to a certain degree of approximation) we need to cast the formalism and the body of experience into comparable forms, and this means axiomatizing the experience to a greater or less extent. Initially it may be vague and intuitive; and if so it must be subjected to a process of philosophical analysis, whose purpose is to allow it to be reformulated by means of precise statements which use only well-defined terms. We shall see below that this process of assimilating the body of experience to the formalism is in fact very much more than mere logical clarification of a rather confused body of knowledge and belief, and that the formalism tends to exert a formative influence on the "experience" itself. But before going into this general question we need to consider a few specific examples of mathematical formalisms and their realizations.

(i) *Arithmetic*

The ultimate nature of numbers was for long a vexed question, but at last the fact was appreciated that we can quite well manipulate numbers in accordance with the ordinary rules without ever troubling to specify *what* they are; and eventually Peano was able to rewrite arithmetic as a formalism based on five simple axioms.[1] From these axioms alone it is possible to deduce formal counterparts of very many familiar elementary theorems in the theory of numbers.

The most obvious concrete realization of the Peano formalism is provided by the numbers used in ordinary counting; and we are making use of an arithmetical theorem, in concrete guise, whenever

[1] For a convenient version of the Peano formalism see Hilbert and Bernays: *Grundlagen der Mathematik.*

we infer, say, that two heaps of six objects can be rearranged as three heaps of four. From a strict philosophical point of view, this application of the formal calculus stands in need of justification, and we ought to prove that counting yields a realization of Peano arithmetic. The required justification can in fact be given, although it is not such a trival matter as might at first sight be supposed. Since counting is a very simple operation, and we have a sufficiently clear idea of what it amounts to, we are able without undue difficulty to describe it in purely logical terms. When this is done, the concrete system may be compared with the abstract, and it may then be shown that it satisfies all the Peano axioms—and so, in consequence, all the derived theorems are of necessity valid for it just as for the formalism. The work done by Russell[1] in defining cardinal numbers by means of classes of classes that can be put in one-one correspondence gives us just what we want in the way of a logical definition of counting. In this instance, therefore, the solution of the problem of application is straightforward, for it involves a logically simple formalism and a body of experience that can be described, without distortion, in precise logical terms.

(ii) *Geometry*

The Greek geometers looked upon geometrical propositions as statements about the actual space which constitutes, so to speak, the substratum of the world; but at the same time they were very persistent in forming these propositions into a deductive system in which the logical interdependence of the separate statements would be clearly exhibited. Thus when Euclid composed his *Elements* he took a few simple self-evident propositions as axioms and then proceeded methodically with the deduction of more recondite properties of figures. His system was not quite a formalism since the entities involved were not wholly abstract; but it was so nearly a formalism that, at the end of the nineteenth century, Hilbert (the founder of the Formalist school of mathematical philosophers) was able to turn it into one by making only slight modifications. So it was that euclidean geometry became a formalism in our sense of the word. It is, of course, but one geometrical formalism among many, other familiar ones being the non-euclidean geometry of Bolyai and Lobachevsky and the more recently developed riemannian geometry.

Although Euclid's geometry was not fully abstract, it was certainly not a set of statements about direct experiences, and of this Euclid himself was no doubt fully aware. Space was looked upon as objectively existent; but it was understood that the points, lines and planes of the geometer can never be perceived by the senses. They are ideal objects, and whether they exist in objective reality or only in the

[1] See Russell: *Introduction to Mathematical Philosophy.*

minds of geometers, there can be no denying that the nearest thing actual experience has to offer is a very rough approximation to the perfect figure. But now that euclidean geometry has become a formalism we can drop the question of the sense in which points and lines can be said to exist, and turn instead to the problem of the application of the formalism. Does the space of common experience have the structure described by Euclid, or to what degree of approximation is this the case? As soon as we put the question in such terms we see that we are up against serious difficulties; for what is meant by the "space of experience"?

There is, of course, the space in which our perceptions are arranged, i.e. the space which Kant described as a form of sensory intuition. Kant believed it to be certain *a priori* that this space possesses the euclidean structure, but we to-day would certainly not claim as much as that. On the other hand it does seem undeniable that perceptual space has some structural features in common with Euclid's model, e.g. the property of being three-dimensional. The space does not necessarily furnish a realization of the euclidean formalism (and perhaps it is not sufficiently well-defined for the question really to arise) but there is a genuine problem of fitting an appropriate mathematical formalism to it.

Besides perceptual space there is also physical space, in which the objects described by physics are supposed to be located. We arrive at this space, as has been explained in detail by Russell,[1] not by intuition but by an elaborate process of intellectual construction, and it is for this reason that the corresponding problem of application is so difficult. How, in fact, are we to describe the relevant body of experience in precise terms? We might attempt to define physical space by a coordinate network constructed by means of a rigid measuring rod; but then we would have to provide a criterion for rigidity and inextensibility of the rod. We know well enough what would be accepted in practice as a satisfactory measuring rod, but when we try to make the description of physical space sufficiently precise for it to be significant to ask whether or not this space is euclidean we find ourselves in great difficulties. It seems that, in the last resort, we cannot isolate the geometrical properties of physical space, and that we must take them in conjunction with other physical properties of matter. If we wish to define distance in terms of a rigid rod we must say what is meant by rigidity, and this cannot be done in purely geometrical terms. Thus the problem of application of euclidean geometry to physical space turns out to be illusory, and it must be replaced by the wider problem of application to the physical world of a comprehensive formalism which covers both geometry and mechanics—the formalism of the theory of relativity, for example.

[1] See, for instance, Russell: *Human Knowledge.*

(iii) *Symbolic Logic*

Aristotle codified deductive inferences in the figures of the syllogism, exhibiting in this way logical relations between the propositions of any deductive system. In more recent times logical structures of this kind have been studied intensively, and the study has led to the development of a formalism, the propositional calculus or Boolean algebra, that is analogous in many respects to ordinary algebra. We have here a formalism, as fully mathematical as any in classical mathematics, whose natural domain of applicability is deductive reasoning. It has other realizations—in the algebra of classes, for example—but this is the really interesting one, as it was by abstraction from ordinary logic that the calculus was arrived at. We therefore ask to what extent the propositional calculus exhibits the essential structure of deductive inference (of a suitably restricted kind) and how such a formal representation comes to be possible. It is sufficient for our present purpose if we confine ourselves to this very simple logical formalism, but in a more detailed discussion of the subject we should, of course, need to consider the more elaborate calculus which includes propositional functions as well as propositions.

The classical example of deductive reasoning at its best and most lightly developed is the system of geometrical theorems constructed by Euclid, and this system has for long set the standard of deductive argument, even in cases where the pattern does not in fact fit. It is such reasoning that provides a body of experience in which the Boolean structure is found to inhere. It should be noted, however, that even as deductive reasoning the arguments used in geometry are of a severely restricted kind, having an artificiality that is hardly ever met with outside pure mathematics. The concepts involved in euclidean geometry are simple and few in number, and they are precisely defined from the moment of their first appearance; the properties of geometrical figures can be formulated in simple statements, each of which can be taken by itself and yet fully understood; and the process of deduction whereby the successive theorems are derived can be split up into separate steps, the validity of each of which can be checked without reference to the argument as a whole. In short, geometrical reasoning is atomistic, or at least it can readily be atomized without doing violence to its nature.

It is because geometrical reasoning has so simple a pattern that its structure can be summed up adequately in a formalism; and it can only have this simple pattern because its subject matter is highly abstract. When we turn away from the idealized world of points and lines, and begin to reason about concrete reality, all this logical simplicity at once vanishes. Reasoning is then an extremely complex process, depending more on exercise of judgment than on manipula-

tion of formal logical relationships, and it is extremely doubtful whether any formalism can represent its structure even approximately.

(iv) *Probability*

Although the study of probability has a long history, it is only in comparatively recent years that the mathematical and philosophical elements in the theory have been properly differentiated from each other. For a long time even ostensibly mathematical presentations of the theory combined discussion of the nature (or supposed nature) of probabilities with derivation of the formal connections that exist between them. As the ultimate nature of probabilities remained in dispute, the subject was inevitably highly controversial.

Various views have been held as to what probabilities really are—degrees of belief, frequencies of occurrence, measures of latitude (*Spielraum*), or expectations of benefit—but in spite of such divergences of opinion there has been a large measure of agreement concerning the way in which probabilities behave, and a calculus of probabilities has been evolved which satisfies almost everyone, irrespective of the school to which he belongs. This calculus is of course a formalism, in the sense in which we have been using the term, and in the more recent books on the mathematical theory of probability it is presented in axiomatic form. The common mathematical content of the rival theories of probability has thus been isolated and withdrawn from the realm of controversy, so that the *mathematical* problems which still remain unsolved are not now different in kind from those in any other branch of mathematics. The controversial part of the theory of probability is seen to be the part which involves the application of the formalism; and the problem of application is, of course, primarily a concern of philosophy.

What is really in dispute is the exact body of experience in which the formalism is supposed to find a concrete realization. It has been maintained that this body of experience is inductive reasoning, and that the calculus of probabilities is related to induction in much the same way as traditional logic is to deduction; while an opposing school has insisted, against this view, that the proper body of experience is provided by statistical regularity in nature and in economic affairs. Since a single formalism can admit of many realizations, there is no reason *a priori* why both schools should not have right on their side, at any rate in their positive assertions; but the fit turns out to be not at all easy in either case, and it is now plain that the philosophical problem is a difficult one which is not susceptible of any facile solution. With regard to the suggestion that the formalism may be interpreted as a logic of inductive inference, it may be remarked that if even the Boolean formalism applies not to deductive

reasoning generally but only to the very restricted deductive reasoning that is used in abstract argument of the kind familiar to geometers, it is hardly likely that the structure of inductive reasoning can be represented at all adequately by a simple formalism.

We have now looked at four different formalisms, of varying kinds, and seen for each of them how the far problem of application can be regarded as solved. For the arithmetical formalism it is solved completely, and the solution is made possible by Russell's definition of cardinal numbers by pure logic. The problem is also solved for the propositional calculus, although it turns out that the formalism is realized only in a drastically restricted body of experience, namely deductive inference in the geometrical manner. For the formalisms of euclidean geometry and probability the problem of application can certainly not be considered solved. In each of the two cases it is plain to common sense that there is a rough and ready agreement between theory and experience; but when we try to give a precise account of the experience and to identify its structure with that of the formalism we find ourselves faced with very difficult philosophical issues.

One thing that has emerged very clearly is that the problem of application of a formalism is never trivial. Even in the very simple case of arithmetic the solution requires Russell's subtle analysis of the concept or number, and in every case some such philosophical analysis of the body of experience is essential. This is the characteristic difficulty of the problem—how to bring out the structure in a body of experience, which is necessarily vague and intuitive, without idealizing this experience to such an extent that it is transformed into something quite other than itself. Experience of counting is especially simple, because counting is already a logical procedure; but where extra-logical elements are involved in a body of experience some idealization is unavoidable.

Quite generally, idealization is involved in every attempt at treating experience scientifically. At the level of common sense, all experience is unwieldy as far as intellectual grasp is concerned, even when practical skills enable us to direct and manipulate it with some efficiency. Each event or episode has its own individuality, and significant general characteristics are hard to recognize. It is one of the principal functions of science to replace individuals by types and empirical relations between individuals by theoretical relations between types which are deducible from a small number of fundamental natural laws; and this can only be done by a process of idealization and schematization. When experience has been idealized in this manner it can be described by means of a fixed language, using words only in senses which can be defined precisely at the outset and with meanings that do not alter as the discussion proceeds. Idealized experience thus bears some resemblance, in this particular, to Euclid's

geometry; and there is therefore some chance of isolating its structure and representing it by a formalism. Putting the same conclusion in the language of common sense, we can say that as science becomes more exact it tends to become more amenable to mathematical treatment. The appropriate formalism need not be that of arithmetic, algebra, and the infinitesimal calculus—which happens to be the one which is required by classical dynamics—but it is reasonable to expect *some* formalism to fit.

It is implicit in what has been said so far that to conceive of the problem of application in terms of fitting a ready-made formalism to already existing experience, by showing that the experience possesses the structure of the formalism, is to misunderstand its true nature. The mistake is natural enough, but it can only be made by one who has failed to appreciate the cardinal principle that there is no such thing as virgin experience. What common sense takes to be immediate and unalloyed experience is in reality an elaborate artefact of the mind, for which something that may be described very loosely as brute experience possibly supplies the raw material but which possesses also a form impressed upon it by the presuppositions, conscious and unconscious, of the person to whom the experience belongs and by the methodological procedures that he uses. The mind never ceases to organize and idealize its material, and what appears at any time to be raw experience is actually the product of idealization which is carried only as far as the stage immediately preceding that reached by the mind's activity at the moment.

Perhaps the most familiar process of idealization is the one by which we advance from every day observation of the way in which things can be made to move to the science of dynamics. The experience here is the observed behaviour of inert material bodies; but a moment's reflection is sufficient to show that this experience is far from immediate. The raw material has already passed through a sieve whose meshes are quasi-mathematical concepts such as distance time, function, limit. Whether the spatio-temporal structure which the mind impresses on its experience is innate and *a priori*, as Kant supposed, or whether it has been evolved by a historical process, there can be no doubt that it *is* an impressed structure, and that in impressing it the mind is idealizing its experience. It seems reasonable to suppose that the framework is a historical product and, as a corollary to this main assumption, that the mathematical formalism employed by Newton was slowly evolved side by side with the idealized body of phenomena which was to provide one of its most valuable realizations. If a formalism that is both familiar to mathematicians and easy to handle fits a given body of experience tolerably well, the mind has a strong motive for idealizing the experience still further (say by suitable extension of meaning of terms, or redefinition of

concepts) in order to improve the fit, and to continue so doing until discrepancies are encountered which cannot be smoothed away in any such manner. We have reason to suppose, therefore, that classical pure mathematics finds so complete a realization in Newtonian dynamics by reason of the process of natural adjustment by which, in the course of centuries, the two studies were gradually assimilated to each other.

At the present time it is of particular interest to consider realizations of mathematical formalisms in the realm of intellectual experience, i.e. in bodies of thought—both of formalisms which are already known and those still being developed. We have already discussed two such realizations, the application of Boolean algebra to deductive logic of propositions and the problematic application of the calculus of probabilities; and a kindred problem is being tackled along a different way of approach by the mathematical engineers who are engaged on designing machines intended to imitate some of the operations of the human mind. The whole problem of the application of mathematics to thought is of considerable philosophical interest, although as yet its profundity has scarcely been appreciated. The problem of application of a formalism, as has already been made clear, is never trivial; and it cannot be adequately discussed, let alone solved, until the relevant body of experience has undergone thorough philosophical analysis. In the case of thought, oddly enough, the necessary philosophical analysis has not yet been carried nearly far enough.

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CAN MACHINES THINK?

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I

MR. A. M. TURING was quoted in *The Times* about a year ago as saying it would be interesting to discover the degree of intellectual activity of which a machine was capable and to what extent it could think for itself. He has now pressed this suggestion further and given the results of his researches in an article called "Computing Machines and Intelligence," together with a brief account of a "child-machine" which he has attempted to educate (*Mind*, October 1950). I intend to discuss this article in some detail and examine his claim that "machines can think."

Apparently his machine will have the following attributes:

1. Think, write, play games and remember.
2. Make decisions, suitable and unsuitable.
3. Observe the results of its own behaviour.
4. Achieve a purpose.
5. Learn by rewards and punishments.
6. Obey commands.
7. Deliberately introduce mistakes in its working.

Turing protests that it is absurd and dangerous to suppose that the answer to the question "can machines think" is to be sought in a study of the way these words are normally used. In its place he substitutes a definition in terms of the machine's capacity to play an imitation game which seems to be a variation of the radio game of Twenty Questions, the part of the witness being taken by a computing machine, the part of the interrogator by a human being. Machines able to play the game do not as yet exist, but Turing is firmly confident that in fifty years time it will be possible to programme computors to play the imitation game. He therefore replaces the original question, "Can machines think?" by the question, "Are there imaginable digital computors which would do well in the imitation game?"

Turing believes linguistic usage will have altered so much by the end of the century that one will be able to speak of machines "thinking" without expecting to be contradicted. Nevertheless, if we were merely concerned with the definition or use which Turing gives to the expression "machines can think," or the state of the English language in A.D. 2000, there would be no problem at all for us. People would not feel surprised and a little hurt by this suggestion which brings up to my mind, at least, the image of shapeless masses of metal cogitating in a Rodin-like manner.

It is therefore of some importance, as well as interest, to know how people actually use the words to-day, and not how they may use them at some future date. As we are unable to embark upon a Gallup survey, the simplest method is to consult the dictionary; despite obvious shortcomings it gives a fair indication of the way these words are normally used.

The most relevant of the O.E.D. definitions of a machine is "a combination of parts moving mechanically as contrasted with a being having life, consciousness and will. Hence applied to a person who acts merely from habit or obedience to a rule, without intelligence, or to one whose actions have the undeviating precision and uniformity of a machine."[1]

From the point of view of modern neo-behaviourism this account may seem a little old-fashioned. Perhaps it is as well to make a confession of faith here. I accept the evidence of my own introspections, as well as those of other people, that there are such things as private psychological events, however heretical such a view may seem to-day. The O.E.D. definition does bring out one thing at least, a machine is usually thought of as something which does not possess a private life of its own, it does not indulge in reverie when at its task, it lacks consciousness, intelligence and will.

In the light of the above, one sees the point of Professor Jefferson's remark, "When we hear it said that wireless valves think, we may despair of language,"[2] and it is precisely because by a machine we mean something which does not possess intelligence or consciousness that we boggle at the assertion "machines can think," despite Turing's attempt to streamline it. In a sense it is a puzzle of our own making; machines are defined as not having precisely those characteristics of thought, feeling and conation which we assign to a human being. We have expressly ruled out any internal private life. Though it may duplicate our overt or external behaviour, it cannot, we say, duplicate our internal activities.

In other words, if it repeated statements such as "I feel toothache," "I enjoy strawberries and cream," "I hate Mr. X," we would not attach the same significance to them as we would if these statements were made by a human being. They symbolize a privacy of experience which we refuse to attribute to machines. We might suppose there was a gramophone record inside.

As John Locke and, for that matter, Descartes pointed out, if we found a parrot who talked and argued like a man, we would be reluctant to admit that it exercised conscious thought (or even that it was capable of indulging in linguistic skills), whereas we would

[1] *New English Dictionary*. Oxford, Vol. VI, Part II, M–N, p. 7.

[2] G. Jefferson, *The Mind of Mechanical Man*, The Lister Oration. *The British Medical Journal* (1949), p. 1,110.

still be inclined to attribute some sort of mental life even to a moron.

We usually reserve the term "thinking" for human beings; who have a peculiar complex of mental characteristics, who show certain patterns of behaviour and who are not only able to think, but sense, feel and will as well, and to think and will because they sense and feel. Discussion of thinking in the abstract obscures the fact that thinking, at least on its psychological side, is a complex activity in which feeling and conation are inextricably intermingled. One of the few places where pure thought is to be found is in Immanuel Kant's *Critique.*

If, however, we did come across an artifice which showed every sign of intelligent behaviour, and was yet in appearance very unlike a man, we would nevertheless hesitate before asserting it was capable of having psychological experiences. We might not be able to make up our mind whether it was a living thing (a man from Mars) or some sort of mechanism. Biologists are familiar with such situations.

Consider an illustrative example. To-day there is little risk of confusion between a motor-car and a motor-cycle. However, some enterprising person may yet produce a gyroscopically driven vehicle intermediate between the two. And in practice we would introduce a new class-label to cover this case.

So, in the same way, it may be necessary to introduce a new label to indicate a device which simulates overt human activities without at the same time duplicating our internal behaviour. The word is ready to hand and was coined by Karel Capek, we call them "robots," those devices which fall in the twilight zone between man and the normal run of machines; devices which it must be remembered are still in the realm of fiction—in the imagination of their authors.

In this connection it might be a good thing to drop the word "machine," with its emotional overtones of clanging metal, and use some such neutral word as "artifice." Machines which can perform logical and mathematical operations are very different from the steam-engines, printing-presses and looms met with in our everyday excursions.

The paradoxical Frankenstein nature of the machine-mind arises from the intrinsic difference in our conceptions of minds and machines. At least for the unphilosophical person, minds have a certain privacy about them. I can directly inspect the contents of my own mind, but not that of my neighbours, which is, no doubt, all to the good.

The difficulty vanishes of course on Turing's definition, but then the meaning of the word "thinking" has changed to such an extent that it has little in common with what we normally mean by it. If a machine could perform this or that human function it would

not be what we now mean by a machine. Its meaning has been stretched to such an extent that we might even seriously contemplate calling it a new type of organism. An example of this is seen at the end of R.U.R. where a pair of robots (male and female) develop inner lives of their own. The number of facilities a sufficiently fertile imagination could project into these contrivances appears to have no upper limit.

Even if it were possible to construct a machine whose behaviour was indistinguishable from that of a human being, and even if we accept the behaviourist criterion it might still be useful to distinguish between men produced by natural methods and artificial men (or robots). The same shame might be attached to be being born the natural way as we nowadays attach to illegitimacy. A different label might indeed become a social necessity.

In any case, the words "Thinking" and "Intelligence" are vague, replete with ambiguities and intrinsically subjective in character. The underlying assumption of many modern theories of intelligence is that intelligence is a simple quality and directly measurable. There are good grounds, however, for believing otherwise, that it is heterogeneous in character, and only measurable by indirect methods.

II

In the true Cartesian manner nearly half of Turing's paper (twelve out of the twenty-seven pages) consists in answering objections. One of the objections considered is the "argument from consciousness." As an instance of this he quotes from Professor Jefferson's Lister Oration of 1949. I give the relevant part of the quoted passage:

"Not until a machine can write a sonnet or compose a concerto because of thoughts and emotions felt, and not by the chance fall of symbols, could we agree that machine equals brain." (p. 445.)

Turing blandly states that such a view logically leads to solipsism, and gives Jefferson the alternatives of either accepting solipsism, or his own definition of thinking in terms of the imitation game. There is, however, no connection between the solipsist position and what he calls the argument from consciousness. Though this argument asserts that we are directly aware of our own internal states, it does not exclude indirect knowledge of other people's minds, and it does not even have to assume that we have certain knowledge of our own minds. The alternatives are therefore not exclusive and Jefferson need not accept either.

Further, if I understand Jefferson rightly, he is not just saying that machines will not be able to write poetry, but that he does not feel justified in describing their performance as thinking until they write poetry or compose concertos, or for that matter construct

mathematical theorems, because of thoughts and emotions felt: *felt* being the operative word here. Turing apparently takes this as an argument for solipsism. It seems rather to be a causal statement describing how creative minds produce poetry, music and mathematics. The type of person who bears the strongest resemblance to digital computors, are the so-called lightning calculators, who are often uneducated men, and even sometimes feeble-minded.

Turing's sonnet-writing machine (p. 446), which shows up so well in the *viva-voce* examination, is not I think relevant to the discussion. It does not follow that because q, the sonnet-writing behaviour, occurs, that it is due to p, thoughts and feelings felt; it may be due to a bank of relays or a regiment of monkeys hammering away on typewriters, though their speed and output would be lavishly increased if they were armed with modern digital computors. Jefferson could still refuse to accept the imitation game as a definition of thinking, if it was not due to p.

From what has already been said, it will be seen that the question "Can machines think?" means something very different for Turing than it does for Professor Jefferson. For Jefferson, and I should say for most ordinary people, any definition of the word "thinking" would also include certain psychological characteristics. Turing and Jefferson are in fact speaking two different languages; in the behaviouristic (or physical) language of Turing—words which only have an objective physical content appear (or should appear), electronic tubes, flip-flop circuits, programmes, etc. It is a deterministic machine language in the grand manner of nineteenth-century Newtonian physics.

In the psychological language used by Jefferson words like consciousness, freewill, decision, etc., appear. But words like desiring and feeling ought by their very nature to be prohibited from Turing's account. And though it has been assumed by Carnap and others that the psychological language is translatable in terms of the physical, there is as we shall see little justification for this belief.

When we describe the functioning of mechanisms we need to remain within the bounds of the physical language, and not include in our descriptions subjective words and phrases from the psychological language, otherwise we shall find our account infected by more than a mild attack of animism.

Turing, in his account of the wonders of digital computors, does this at every stage and turn. He talks of "machines making decisions," of "being punished and rewarded," "deliberately introducing mistakes," "doing homework," obeying orders, etc. And he concludes his article with the following valediction.

"It can also be maintained that it is best to provide the machine with the best sense-organs that money can buy, and then teach it

to understand and speak English. This process could follow the normal teaching of a child. Things would be pointed out and named, etc. Again I do not know what the right answer is, but I think both approaches should be tried." (p. 460.)

It would indeed be idle for me to count the number of words Turing uses from the psychological language in his article; none of which he has attempted to redefine objectively as he has with thinking. They are still heavily loaded with emotive and subjective content, and have an essential reference to private psychological states. It would be interesting to know whether the subjection of the machine to punishments and rewards consists in anything more than the switching on and off of its power supply. The use of such emotively toned words (which also seem to express value judgments) makes one think immediately of someone precariously balancing a calculating machine on his knee and chastising it.

Any attempt to describe the behaviour of machines (defined in terms of overt behaviour) by means of such a subjective vocabulary will make confusion worse confounded. It is for this reason that it does not make sense to talk of machines having the following psychological characteristics. They are the disabilities of machines mentioned on page 447, and occur in the argument which takes the form.

"I grant you that you can make machines do all the things you have mentioned but you will never be able to make one to do *X*."

It will be observed that *X* is generally an item from the psychological language, or a value judgment.

"Be kind, resourceful, beautiful, friendly . . ., have initiative, have a sense of humour, tell right from wrong, make mistakes . . ., fall in love, enjoy strawberries and cream. . . ."

Although it might be possible to make a machine enjoy strawberries and cream, any attempt to make one do so, he thinks, would be idiotic. No reasons are given for this assertion. Useless perhaps, but, if it were possible, would it not be worth while making such a machine, would it not be another marvel in the thesaurus of the mechanical necromancer? Or does Turing implicity recognize that it would be meaningless to talk about a machine "enjoying anything," since the word "enjoyment" has a meaning only by reference to our private feelings, no place for which, however, can be found in the physical language. As Hartree warns us, the "specialized use of words already current may lead to misunderstanding, particularly when words habitually used in connection with living organisms, and especially with human activities, such as "memory," "choice," "judgment" are applied to mechanism."[1]

[1] D. R. Hartree, *Calculating Instruments and Machines*, p. 54 (Cambridge 1950).

III

When Turing wants to know whether there are imaginable computors which could do well in the imitation game he asks the following question:

"Is it true that by modifying this computor to have an adequate storage, suitably increasing its speed of action, and providing it with an appropriate programme, *C* can be made to play satisfactorily the part of *A* in the imitation game, the part of *B* being taken by a man?" (where *C* is, of course, the digital computor) (p. 442).

Now this is a question to which the answer true or false cannot be given (at least not until fifty years time). It asserts a proposition about a hypothetical future state of affairs. All that can be said is that we just do not know, as this is a truth depending upon the physical actualization and not upon the conceptual possibility of the principle. As Kant pointed out a long time ago we cannot argue from a logical possibility to the possibility of the existence of a real thing.

In principle there is perhaps no reason why an elephant should not have wings, there is no logical reason why we should not all live to be as old as Methuselah, or for survival, but there may be important physical reasons to the contrary. There may be important physical limitations, spatial, temporal, and mechanical, why it is not possible. I believe, but I may be mistaken in this, that engineers are already finding that there is an optimum limit to the size of computing machines. If this should prove to be the case, the computing machine (which is going to imitate the brain) as large as the Empire State Building and powered by the Niagara Falls, will still remain a subject for conjecture in those journals devoted to astounding science fiction.

Mumford points out that certain machines have already reached the limit of their development, e.g. the printing press, the water turbine and even the telephone system, the only gain is one of cheapness and universality. If a very good page of print is needed it still has to be set up by hand; "there are bounds to mechanical progress within the nature of the physical world itself. It is only by ignoring these limiting conditions that a belief in the automatic and inevitable and limitless expansion of the machine can be retained."[1]

Turing tells his readers that digital computors "can in fact mimic the actions of a human computor very closely" (p. 438). His statement of fact seems to be a most dubious one, unless he is using mimicry in a very peculiar sort of way where it can have no reference to "purposive imitation." As a large part of his case

[1] L. Mumford, *Technics and Civilization*, p. 424 (Routledge 1934).

rests on his conception of "mimicry" it is necessary to give an analysis of it.

Apparently it consists of three stages.

1. Asking a human computor how he performs the arithmetical operations of addition, subtraction, multiplication, etc.

2. Coding the answer in the form of an instruction-table in terms of a string of I^s and O^s.

3. Inserting the programme into the machine.

"Mimicking" for Turing is then a complex operation and consists in a human programmer translating the human computor's answers into the binary language, and then inserting the coded programme into the machine.

Conceivably 1, 2 and 3 could be done by another machine, but then we are faced with a regress until we come to a machine where the programme was made and inserted by a human being. Indeed, one could in the same way talk of a pianola (or a similar instrument) mimicking the behaviour of a pianist, the analogy is in fact precise.

The phrase "digital computor" seems to be used in a rather ambiguous way. Sometimes it refers to the machine standing on its own feet as it were, and sometimes to the loaded machine with a programme inserted in it. These are two very different things. Even if we are generous and take the latter interpretation, and even if we conveniently erase from our memories that it has been programmed by the "slave to the machine," it still could not be said to be mimicking a human computor, as mimicking means purposive imitation. If Turing wishes to restrict himself purely to a description of the observed behaviour of the machine, without entering into any discussion of its causation, the most he is entitled to claim is that there is a relationship of similarity between its behaviour and the behaviour of a human computor, and not that the relationship is one of "mimicking." ["Mime" in its original use as seen, e.g. in ballet, was rather an attempt to communicate emotive states by overt symbolism.]

However, there are limitations in the art of translation. Shakespeare loses his essential quality when translated into basic English. Even natural languages owing to differences in physical structure and vocabulary are not precisely translatable into each other—"traduttore traditore." If basic English is thus limited what are we to say about Boolean algebra, a language with an alphabet of two letters, 1 and 0, and an extremely simple grammar? Despite Leibnitz's auguries, as a universal language it is hopelessly inadequate. Such a view naturally accepts the principle of extensionality that all logical expressions are translatable into terms of truth-values (i.e. 1^s and 0^s) and, surprisingly enough, implies that semantic expressions are also thus reducible.

It is merely a conceit of the logician to imagine that the main function of natural language is to transmit information rather than to communicate personal and social feeling. In poetry, literature and everyday discussion, the truth and falsity of statements quite often play a very minor and unessential rôle. One might say that verse written in abstract logical form, with signs expressing combinations of truth-values, would not be poetry, nor even dull prose, but just bad logic.

Turing suggests that instead of trying to imitate an "adult mind" it might be a good thing to produce a programme which simulates the child's mind. By subjecting it to an appropriate course of instruction we would arrive at the "adult brain." The essentials of this projected course are sketched on pages 456 – 59 and closely resembles the treatment meted out to a "Bokanovsky Group" of infants in the Neo-Pavlovian Conditioning Room in Chapter II of Aldous Huxley's *Brave New World.*

"Adult mind" and "adult brain" are used by Turing interchangeably (cf. p. 456, l.2 and l.4), there is a tacit assumption of identity. "Presumably," he tells us, "the child-brain is something like a note-book as one buys it from the stationers. Rather little mechanism, and lots of blank sheets." He hopes that the child-brain will turn out to have little in the way of mechanism so that something like it can be easily programmed.

On the face of it, Turing's account bears a strong resemblance to the "tabula rasa" theory of Locke, that the mind at birth is like a wax tablet, its characteristics being impressed upon it by environment and education. Locke's "tabula rasa" theory, together with the principle of association, was indeed an attempt to apply Newton's physical methods to the realm of mind. Compared with the Platonic view, where education is conceived as a drawing out of the child's potentialities rather than the injection of information, the "tabula rasa" theory shows up badly—it appears inadequate and gives an oversimplified picture. The child-mind may have a good deal more internal structure than Turing bargains for.

What, on Turing's view, corresponds to the human mind is, however, not just the machine, but the machine plus the instructions fed into it. Without the programme it cannot be compared to a mind at all. With the programme it is no longer a "tabula rasa"; an uncharitable critic might say that it then contains a selective group of innate ideas inserted not by a benevolent Deity, but by a human programmer.

In physics, mechanical models with their deterministic structure and misleading pictorial suggestions have fallen into disrepute and been replaced by abstract statistical concepts. The abolition of the Newtonian machine model has led to enormous advances in physics,

and yet, curiously enough, just when this happened, its ghost has appeared to haunt the councils of biologists and psychologists.

Machine analogies are in fact a variety of animism. Professor Ryle points out that there are few natural machines in nature; "inventing machines is not copying things found in inanimate Nature."[1] If we want to find examples in nature of "self-maintaining routine observing systems," we have rather to look to living organisms. The machine is not then something superior to the men and women who design and construct it, it is, in fact, an inferior type of animal, "a sort of minor organism, designed to perform a single set of functions."[2] By describing a human being in terms of such a model, we do not exactly flatter him, but neither for that matter do we become any the more objective or scientific.

And because a machine is usually at its best when it deals with some single function in isolation, e.g. the principle of the wing abstracted from the bird and given its concrete translation in the aeroplane, the most ineffective kind of machine is that which tries to give a realistic imitation of man or beast, "technics remembers Vaucanson for his loom, rather than for his life-like mechanical duck which not merely ate food but went through the routine of digestion and excretion."[3] Undoubtedly this is one of the reasons why the machine to enjoy strawberries and cream, or to be friendly, appears so stupid.

Turing assumes in his article that the fundamental characteristic of intellectual activity is to give a yes or no answer. In other words, he identifies logic with thinking and implies that intelligence and the capacity for emitting logical noises are identical. Human thought is stripped of its emotive, conative and pragmatic characteristics, which is pretty roughly what we mean by a mechanism. Even Craik, who was very fond of drawing analogies between calculating machines and human minds, nevertheless appreciated that it was "illegitimate to separate thought completely from feeling."[4] Feeling and a capacity for aesthetic appreciation play an important rôle not only in ordinary thinking, but also in mathematics.[5]

There are certainly methods of performing computations other than that employed by human beings; there are calculating machines, slide-rules, abacus, etc. But it is important to distinguish between the end-result and the method by which it is arrived at. To take a simple example, the way in which a logical machine operates: the

[1] G. Ryle, *The Concept of Mind*, p. 82 (Hutchinson's 1949).
[2] L. Mumford, *Technics and Civilization*, p. 11 (Routledge 1934).
[3] L. Mumford, *Technics and Civilization*, p. 32 (Routledge 1934).
[4] K. Craik, *The Nature of Explanation*, p. 86 (Cambridge 1943).
[5] Cf. J. Hadamard, *The Psychology of Invention in the Mathematical Field* (Princeton 1945).

premises are fed in, all its possible combinations are developed (in the form of Boolean expansions) inconsistent alternatives are eliminated and the answer is flashed out. The whole process is simply one of classification and sorting. Insight does not come in at all.

With suitable adaptations a machine could be constructed with the facility for performing intelligence tests, e.g. Raven's matrices, at a much greater speed than little boys and girls could. One might even talk of the I.Q of the machine, yet no one would seriously think of attributing intelligence to it. What is important is not what it does, but how it does it: a point overlooked by intelligence testers in the past.

Thinking is usually defined epistemically (i.e. psychologically). It now seems to refer to the logical manipulation of strings of symbols, so that any process such as a physical collection of relays, or a bank of electronic valves which gives the correct answer, is identified with thinking. It does not, however, follow that because the end-results are identical the intervening processes are, too. If a man picks the Derby winner by sticking a pin into the back page of the *Sporting Chronicle* it does not follow that he has been exercising conscious judgment, that he has been a diligent student of Oakeshott and Griffith's *Guide to the Classics*.

One has to be careful not to identify logic with psychology. Apart from the testing of its correctness or incorrectness, thinking is in no way the concern of logic. From the point of view of logic there is little to choose (except in precision) between the performance of a man and a machine. A human being might well be looked at as a machine for producing logical conclusions. The propositions are fed in through the ears (input) and after a short pause the answer emerges from the mouth (output) in the form of words. Behaviouristically, there is little or nothing to choose between his reaction and that of a machine. Epistemically, the picture is quite different, the process of thinking about these propositions, of knowing their truth and falsity, is something entirely different from the logical formulae contemplated.[1]

Indeed, one might say that a logical calculus is in a sense the very antithesis of thinking, since it is a mechanical routine substituted for our intuitive, and often vague and imprecise, thought processes. "As a material machine is an instrument for economizing the exertion of force so a symbolic calculus is an instrument for economizing the exertion of intelligence."[2] By applying the rules of the system we

[1] Cf. W. E. Johnson, *Logic*, Part II, Chapter I (Cambridge 1922).

Pierce's views on logical machines are of interest. *C. S. Pierce's Collected Papers*, Vol. II, *Elements of Logic*, 2.56, 2.59 (Harvard 1932).

[2] W. E. Johnson, "The Logical Calculus I" *Mind*, N.S., Vol. I (1892), p. 3.

are enabled to make very complicated and long chains of deductions with a minimum of thought and effort. We translate our concepts into the basic signs of the calculus, perform operations upon them and retranslate back again. We have produced what in effect is a simple logical machine.

But if we grant that logical machines are complex pieces of symbolism, a development of the visual aids to thinking which we have known for centuries, in order that the signs may acquire a significance they need to be given a specific logical or mathematical interpretation. As Whitehead tells us, though we can study the art of practical manipulation of these signs without needing to assign any meaning to them, abstract calculi only possess a serious scientific value when they can be given an important interpretation.[1]

Neglect of the pragmatic or instrumental aspects of such machines, leads to the tendency to attribute to them a capacity for thinking which they have only by proxy. The transformation of formulae according to a fixed set of logical rules, is not, however, a sufficient criterion of thinking. Unless the resultant formulae or patterns of symbols are retranslated in terms of their referents, the transformation remains a meaningless array of marks. The whole argument then reduces to a tautology; such machines cannot be said to be thinking unless there is an intelligence to programme the machine and interpret the end-result, which is a form of thinking anyway.[2]

These mechanized calculi not only need a power supply, but also an intelligence to operate them, a staff of mathematicians to translate mathematical problems into a form which the machines can handle. To quote Hartree, "all the thinking has to be done beforehand, by the designer and the operator who provides the operating instructions for a particular problem, all the machine can do is to follow these instructions exactly."[3]

IV

A critic might recommend us to adopt a more sympathetic approach. Science as opposed to popular linguistic usage may in a hundred years time verify Turing's hypothesis that thinking can be defined operationally. Popular usage, particularly in science, has, as often as not, been shown to be wrong.

The behaviourist may of course use language in the way he

[1] Cf. A. N. Whitehead, *Universal Algebra*, pp. 3–5 (Cambridge 1898).

[2] Cf. W. E. Johnson, *Logic*, Part II, Chapter III, § 2. "The Logical Calculus I," *Mind*, N.S., Vol. 1 (1892), pp. 3–6.

[3] D. R. Hartree, *Calculating Instruments and Machines*, p. 70 (Cambridge 1950).

pleases, as long as he restricts himself to talking about brain-states or patterns of behaviour. But the difficulty arises when he attempts to show, as he is bound to, the relevance of the behaviourist way of talking to the way we normally talk about our sensations, feelings, volitions, etc. How such phrases as "I see red," "I feel happy," are ordinarily used then becomes highly relevant, the behaviourist has to define them in terms of his own peculiar way of talking.

Further, Ayer, Mrs. Kneale[1] and others have pointed out, that sentences like "this is red," or "I am thinking," are not equivalent to the physical propositions in terms of which the behaviourist wishes to translate them. There is no logical contradiction involved, e.g. in asserting "I feel a pain in my left molar," and denying the correlated physical proposition, "Mr. X has a carious upper left molar." The dentist after examining the tooth may deny categorically that there is anything wrong with it.

The definition of psychological phenomena in terms of behavioural patterns is, as C. I. Lewis[2] points out, comparable to the physicists' assertion that a specific pitch is a particular frequency of harmonic motion. The correlation of the two, however, could never have been established if (*a*) "Middle C" did not first mean something identifiable without reference to vibration, and if (*b*) a "vibration of 256 per second" did not first mean something identifiable without reference to sound. As a result of repeated observation and experiment we come to have a high degree of inductive assurance as to their correlation, and thereafter identify pitch by the physical vibration.

But when we attempt to correlate "seeing green," "feeling pain or anger" with specific brain states or patterns of behaviour the situation is somewhat different, since the correlation is less well-established and in many points of detail quite undetermined. We cannot state with any degree of accuracy what specific kinds of behaviour are correlated with "seeing green" or "feeling pain or anger." Discussions of physical methods of measuring psychological phenomena usually lead to an impasse.

Behaviourists sometimes speak as if all they meant by "seeing green," or "suffering pain," were merely certain patterns of linguistic or bodily behaviour. It becomes clear from the above analysis that such statements are locutions for complicated inductive pro-

[1] Cf. A. J. Ayer, *The Foundations of Empirical Knowledge*, p. 151 (Macmillan 1940).

M. Kneale: What is the Mind-Body Problem? *Proceedings of The Aristotelian Society* (1949–50), pp. 105–22.

[2] C. I. Lewis, "Some Logical Considerations Concerning the Mental," H. Feigl and W. Sellars, *Readings in Philosophical Analysis*, pp. 390–91 (Appleton–Century–Crofts 1949).

cedures, as they assume (*a*) we already know psychologically what "seeing green," or "feeling pain or anger" is like; (*b*) that we have been able to identify certain fluctuating behavioural patterns, which do not have the same constancy nor even objectivity as their physical counterparts, and (*c*) that we have a large measure of inductive assurance as to their correlation, which once again is far from being the case. Behaviouristic operational definitions need then to be taken as very tentative hypotheses.

The relationship between sentences in the psychological (or ψ) language, and sentences in the behaviouristic (or β) language is then not one of entailment, the most we can say is that there is a probability relationship between them. The two series of sentences $\psi_1, \psi_2, \psi_3, \ldots \psi_n$. $\beta_1, \beta_2, \beta_3, \beta_4, \ldots . \beta_n$ seem rather to be related together as elements are in a frequency distribution, or, to put it more precisely, there is merely a statistical dependency. It is also doubtful whether we can use the word correlation here. Correlation in its strict sense suggests that the relationship is a quantitative one, and only perhaps in simple "stimulus-sensation" situations can it be shown that this dependence is in any way quantitative. Statements in the ψ language cannot therefore be translated into statements in the β language. Otherwise the correlation between them would be 1, which is patently not the case.

The basic assumption in applying the calculating machine analogy to the mind is that thinking operates in the form of an atomic system. It accepts Wittgenstein's view of the world as a structure of atomic facts, each fact being independent of the other, and that our logic of atomic propositions reflects it. Such a view of the world and knowledge fits in naturally with Craik's assertion that the brain is a calculating machine which is a symbolic model of the external world.[1] The progenitor is, of course, Wittgenstein; "We make to ourselves pictures of fact." "The picture is a model of reality." "It is like a scale applied to reality."[2] It is but a step from the slide-rule to the calculating machine. Indeed one might say that modern digital computors are electrified pieces of Wittgensteinian logic.

The above theory of logical atomism has as its corollary that the brain is also an atomic system and functions in a purely additive fashion, that all our thought and behaviour is but the summation of the individual behaviour of its (10^9) brain cells. Lashley, Goldstein and Golla believe that the brain works rather as an organic system. "In fact even on the neuro-physiological level we have to regard the nervous system as an organic whole and not as an integration of

[1] Cf. K. Craik, *The Nature of Explanation*, p. 57 (Cambridge 1943).

[2] L. Wittgenstein, *Tractatus Logico-Philosophicus*, 2.1, 2.12, 2.1512 (Kegan Paul 1947).

reflex arcs each with an unalterable function."[1] Defenders of the computing machine analogy seem implicitly to assume that the whole of intelligence and thought can be built up summatively from the warp and woof of atomic propositions. There is a good deal of psychological evidence that we think and perceive in terms of "gestalten," which are not merely the algebraic sums of the elements into which they may be analysed. The fact that there are equally good psychological and physiological theories to which the computing machine analogy does not apply, seems to have been silently passed over by Turing.

To summarize, there are doubts whether the principles of atomicity and extensionality apply in logic. In the light of the work of the Gestalt psychologists it would seem that we think in terms of gestalten. In physiology too, there is a good deal to be said in favour of the thesis that the nervous system operates as an organic whole. Against this background the analogy drawn by Turing between brains, thought processes and calculating machines seems a rather forced one, and begs more questions than it solves.

It is not altogether too fanciful to suppose that the machine analogy, with its emphasis on overt behaviour and abnegation of private experience may, when the doctrines of "Cybernetics" finally percolate down to the lower grades of the Civil Service, lead us to be regarded, more than ever before, as if we were mechanical objects. It is not such a far cry from Aristotle's view that slaves were just human tools, to some future benevolent dictatorship of the Orwell 1984 type, where men may be seen as little else but inefficient digital computors and God as the Master Programmer.

[1] F. L. Golla (1938) *Journal Mental Science* 84.9 quoted from E. L. Hutton "The Relationship of Mind and Matter to Personality," "Perspectives in Neuropsychiatry," p. 166 (Lewis 1950).

For Lashley's criticisms of the neo-pavlovian association theory of learning, K. S. Lashley and M. Wade. "The Pavlovian Theory of Generalization," *Psychological Review*, Vol. 53 (1946), pp. 72–86.

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PHILOSOPHICAL SURVEY

PHILOSOPHY IN ITALY

In the series *Collezione di Filosofia* published by Taylor of Turin since 1947, some of the most significant works on Italian existentialism have appeared. The series was inaugurated by two books by the writer of this article: *Introduzione all'esistenzialismo*, second edition, 1947 (the first edition having been published at Milan in 1942); and *Filosofia religione scienza*, 1947. These were followed by Pietro Chiodi, *L'esistenzialismo di Heidegger*, 1947; Armando Vedaldi, *Essere gli altri*, 1948; Uberto Scarpelli, *Esistenzialismo e marxismo*, 1949; Enzo Paci, *Il nulla e il problema dell'uomo*, 1950; Luigi Pareyson, *Esistenza e persona*, 1950; and Armando Vedaldi, *Struttura della proprietà*, 1951.

Italian existentialism appears with a very definite character of its own in the complex picture of this current of contemporary philosophy. In general it may be said that existentialism is every analysis of existence (understood as the mode of being of the finite entity, hence different from self-sufficient Being) in terms of possibility. Existential possibility is not the Aristotelian potentiality destined to be realized by virtue of the act that, with its priority, sustains and excites it, but retains a character of indeterminateness and uncertainty whereby it may fail to be realized. German and French existentialism has fastened more especially on this contingently negative or nullifying character of existential possibility, adhering strictly to the position of Kierkegaard, for whom anxiety, as the feeling of the possible, is the condition that anticipates, projects, and maintains continually alive the negative and nullifying contingency joined to every possibility as such. Italian existentialism does not obliterate the negative aspect of existential possibility, but tends to grasp, with its analyses, the total significance of possibility itself, hence also its positive aspect, which is contingently constructive, and hence to discern in it an ever open alternative. This point of view does not now lead to the attachment of the possibilities of existence to a stable, solid and certain reality that may afford them an infallible guarantee: in that case they would in fact not be possibilities but potentialities in the Aristotelian sense of the term. What it does lead to is the distinction between possibilities, that is between those that once chosen are still seen as subject to the possibility of choice, and those that, once chosen, exclude the possibility of further choice. The first possibility may be assumed as the very definition of human liberty and of all the values connected with it. The second, the not possible possibility (which does not mean impossible) may be assumed as the definition of the other, of human slavery and the devaluations connected with it.

These concepts are used to-day by an estimable group of young Italian philosophers as working tools in the fields of both theoretical inquiry and historical research. The monograph by Chiodi on Heidegger is, at the present time, the clearest, most precise, and searching study that exists of the first phase of Heidegger's thought, which ends with the work *Che cos'è la metafisica?* (1930). Chiodi has seen that in the philosophy of Heidegger two exigences are present: the metaphysical, which is the fundamental and final one, in so far as Heidegger is preoccupied with the ultimate significance of being in its totality; and the existentialist, in so far as the general significance of being appears to him to be attainable only through the individual comprehension of existence. These two exigences, one of which moves in the direction of the unconditioned and the absolute, and the other towards the conditioned and

finite, appear to Chiodi irreconcilable; and this irreconcilability appears to him to be a motive that has led Heidegger to reduce being to factual existence and authentic existence to pure and simple acceptance of that which is, denying the "ought to be" for the sake of the "is." Chiodi concludes therefore that the incompleteness of *Sein und Zeit*, in which Heidegger deferred to a later work the determination of the sense of being in general, is in reality an intrinsic impossibility of completion, in so far as that determination cannot be arrived at through the analysis of different existing beings, whose being (that is, whose factual reality) is presupposed. In other words, Heidegger has not investigated sufficiently deeply the problem of being as required by existential analysis, and being has thus remained for him in the forms that it assumes in factual reality. Hence it is that the acceptance of the *fait accompli* is the only attitude suggested by the philosophy of Heidegger. It should be remarked that Heidegger's later writings have justified Chiodi's diagnosis; Heidegger has abandoned the existential problem and taken up a romantic position by which being itself, through particular existences, is revealed to man and imposes itself on him by force of necessity. Chiodi will shortly publish an essay on the later Heidegger which will complete the preceding work. In the meantime he has brought to a conclusion the complete Italian translation of *Sein und Zeit*, which will shortly be published by Bocca of Milan, a difficult and meritorious task, which is unlikely to be repeated in other languages.

Essere gli altri by Armando Vedaldi is, in its first part, a clear and sympathetic historical account of contemporary existentialism, the second part illustrating its moral and social aspects. Vedaldi insists on the social relation as an essential constituent of the personality. In this sense he says that "being" for the individual means "being others," that is, finding oneself in those active relations with other persons that characterize the individual and condition his activity. Vedaldi attends particularly to the moral and political corollaries of this position. His new book, *Struttura della proprietà*, also handles this theme. Property, according to Vedaldi, is work itself, meaning by work the action exerted by the existing person on an object, in order to modify it and include it in himself and in order to realize himself in it. This thesis, identifying work with property, makes property itself an indispensable condition of the person, but at the same time restricts and limits the legitimate concept of property, denying any enjoyment of it that does not coincide with the effective exercise of free and responsible activity. Vedaldi is opposed to any form of State capitalism, which does not solve the problem of linking work and property. The social struggle appears to him an indispensable condition in order that the workers, through sharing in the ownership of property and the inherent risk of losing it, may attain to personal dignity and liberty.

Under the title *Esistenzialismo e marxismo* Uberto Scarpelli has written a lucid and concise essay which consigns to destruction some fundamental themes of Italian existentialism. Scarpelli insists especially on the social aspect of that existentialism, whereby, as he says, man does not subsist without society, nor society without men (society, that is, as something different from the relations between individual men). Therefore, while society itself must not be considered as an amorphous mass of equivalent individuals, it is necessary to recognize in every man the possibility of liberty and to desire that every man should be free. In face of this necessity Scarpelli sees no justification in the ethical-political practice of Leninist Marxism, which demands that man should become a simple instrument, and consider others as simple instruments, for the realization of a future perfect society. "Marxism," says Scarpelli, "if

on one side it is humanism and the annunciation of liberty and solidarity, is on the other side denunciation, like negative existentialism (i.e. that of Heidegger, Jaspers and Sartre), and like the mythologies of nation and race, the moral poverty of modern man who shrinks from fatigue and the responsibility of his existence, and evades the effort of seeking on his own account for what is just."

Enzo Paci, to whose activity as a historian I have already referred (*Philosophy*, April 1950), is, among the young Italian thinkers, the one who most actively contributes to the giving of a particular direction to Italian existentialism. His speculative activity is characterized by the ever more rigorous and searching use of the category of the possible, which, as was said above, constitutes the salient feature of this existentialism. The volume *Il nulla e il problema dell'uomo* comprises a series of essays which, while expounding the problems of a *positive* existentialism, that is, constructive and basic for human liberty, bring such problems into relation with those of other contemporary currents of thought (in particular, with neo-Kantism), and with the other forms of existentialism itself. At about the same time Paci published another collection of essays, *Esistenzialismo e storicismo* (published by Mondadori, Milan, 1950), in which are examined problems relating to poetry, history, and religion. Paci's researches, based on a very extensive and vital philosophic and literary culture, successfully aim at illuminating questions of interest in all fields of present-day culture, from the literary to the social, with the method proper to positive existentialism, and at opening a way of communication and establishing a fruitful intercourse between positive existentialism on the one side and the philosophy of science and instrumental empiricism on the other. The review of philosophy and culture, *Aut-Aut*, which he began to publish in January 1951, and which appears every two months, is an effective instrument of his speculative work and is already established as one of the most interesting Italian reviews.

Luigi Pareyson is a meritorious student of German and French existentialism, which he was among the first to make known in Italy in luminous and precise essays. In *La filosofia dell'esistenza e Karl Jaspers* (Naples, 1940) he considered, by way of the figure of Jaspers, the existentialist movement in its complexity, and he dedicated the essays collected in 1947 (published by Sansoni, Florence) under the title *Studi sull'esistenzialismo* to themes and figures belonging to the same German and French existentialism. The volume *Esistenza e persona* (1950), while completing and enriching, from the historical angle, the preceding articles, contains a more explicit formulation of their author's point of view. This point of view is a spiritualism renewed by the experience of existentialism, hence much broader and more modern. Pareyson maintains that existentialism is presented with two alternatives: that of materialism typified by Feuerbach, and that of spiritualism typified by Kierkegaard. For his part, he accepts the second alternative, and seeks to develop it in the sense of a Christian philosophy which has its speculative centre in the relation between man and God, a relation that Pareyson, following Kierkegaard, conceives in terms of the absolute transcendence of God and the gratuitous gift to man of every value. It is an interesting attempt, even if disputable on grounds of the historical and speculative categories of which it makes use. In the meantime Pareyson does not neglect historical investigations; a volume on *Fichte* and another on *L'estetica dell'idealismo tedesco* appeared in 1950, to which I shall refer on another occasion.

NICOLA ABBAGNANO.

DISCUSSION:

THE NATURE AND SOURCE OF MORAL EXPERIENCE

A living thing is a form of process in the universe which has the quality of maintaining its own identity, and enduring in time, while continuously undergoing change. Though existing with, and related to, many other forms of process it has a degree of relative independence. It selects from the manifold data which nature presents to it, those elements with which it may react, in order to maintain and express its own quality of being.

(It will be obvious that I owe the content of this definition to A. N. Whitehead, though I cannot find a particular quotation which contains the whole of it.)

In plants there is, presumably, no element of consciousness. Their behaviour is a passive compliance with the laws of nature.

In the lower forms of animal life there is, apparently, a somewhat similar absence of consciousness. In the higher forms there is evidence of consciousness and of intelligence. They have the capacity, in some measure, to size up a situation and, out of several possible responses, to select one that will serve the purpose, or express the quality of their being in relation to the situation.

When we come to man, the variety of the qualities of process in his being, the capacity of expressing them, and the number and variety of processes in the universe to which he, consciously and unconsciously, responds have increased so much in range and complexity that we are obviously dealing with a being on a different plane.

The increased complexity of his behaviour produces, or is accompanied by, an increased "degree of relative independence" in making the responses to environment which constitute his behaviour. He becomes familiar with problems of behaviour, and in dealing with them he is guided by feelings of "right" and "wrong." It is this moral sense in behaviour, and the imperative quality which resides in it, that I want to discuss. I want to keep the discussion wholly on the level of human experience, to the exclusion of more ultimate questions of the nature of reality.

The interaction between an individual and the society in which he lives is so complex that it is not possible to draw a clear line of demarcation between them. For the purpose of this discussion the individual human being consists of all the qualities which he has inherited or acquired as they have been developed and modified by the influences that have been brought to bear on him by experience. His religious, moral, social and intellectual education, his family relationships, the pressure of public opinion, his health, the moral cultural and emotional climate in which he lives, and other contents of experience, in so far as he has responded to them, have left results, that are interwoven into an organized integrated unity of being under central control. This organized unity is not analogous with the unified functions of the parts of a complex machine. The elements composing it are not static but changing and the unification is seldom complete. The being can tolerate some disharmony among its parts, resulting in the experience of mental conflict, so long as the conflict does not threaten to disrupt the integrity of the whole.

It is in the nature of activity that it works towards an end. There is thus a creative ideal underlying each separate action. There is similarly a creative ideal underlying the individual's behaviour as a whole, vaguely or clearly

entertained. This is concerned with life's values as entertained by the individual.

I am now able to state the thesis which I want to put forward. The complex human being, as described above, still comes within the definition contained in my first paragraph. With the relative degree of independence which he possesses, it is necessary for him to select from the manifold data which the universe presents to him those elements with which he may react in order to maintain and express his own quality of being, at the time of acting. It is obvious from ordinary experience, and has been demonstrated by the case records of psychologists and psychiatrists, that, if man is to maintain the integrity of his being, his behaviour must harmonize with its qualities. It is true that man is so continuously reminded by experience of his own imperfections that some element of disharmony (different in degree in different men) can be tolerated without distress. That does not modify the law that any important disharmony between being and behaviour means a loss of integrity of being and is accompanied by a loss of self-respect, a feeling of distress and a sense of guilt. In extreme cases it leads to partial disruption of personality causing such diseases as anxiety neurosis, obsessions, enfeeblement of will power and loss of self-confidence in action or in judgment. Herein is to be found the source of the moral sense in experience, and the imperative quality which characterizes its demands. A man may, in some circumstances, defy external authority, regardless of sanctions, without loss of integrity, even as the condition of maintaining his integrity, but he cannot defy that which is central in the quality of his own being.

The general principle, stated thus briefly, seems to give too much emphasis to the subjective nature of the moral sense in its relation to behaviour. Some comments are necessary.

Man is, by nature, a gregarious being. Throughout innumerable generations he has been conditioned by heredity, by training, and by the needs of life, to the medium in which he has to live. That is, the qualities of his being fit him and require him to live as a unit in an organized society, in mental, physical and moral co-operation with other members of society. This necessity is not optional. It is natural and unavoidable. This ensures some measure of harmony between the moral sense of the individual and the moral standards of society. The harmony, however, is never complete. The recognition and expression of the differences that arise are as necessary to the well-being of society as they are to the well-being of the individual. A society, such as a healthy, well-organized state, is a special kind of organic unity. It is not formed by the addition of its parts but by their interaction. It has a being differing in kind from its constituent beings. Communication is as necessary to this being as the nervous system is to the being of the individual. It takes place not only purposively by words and symbols but, consciously and unconsciously, by the behaviour of individuals in every social relationship. The things communicated modify, and are modified by, each other. Acting through the gregarious qualities of man they form a "field" of feeling and of thought out of which the public opinions of groups, and eventually of society as a whole, emerge. Society, like the individual, is a "living thing" as defined in my first paragraph. It is changing and dynamic, not static. If an individual in his communications suppresses anything which he considers morally valuable, he thereby keeps something from the "manifold data" with which society has to react—by testing, modifying, developing, accepting or rejecting—in order to maintain and develop the qualities of its being.

The individual is tempted to suppress from his communications elements of moral value, if they are likely to cause social disapproval and opposition.

The strength of the temptation will largely depend on the amount of individual freedom which is permitted by the structure and customs of his Society. The amount can never be unlimited.

On the one hand, Society is compelled by its own nature to organize its members in the way that most effectively serves social ends as conceived at the time the necessary laws and regulations are made. The less provision that is made for non-conformity to law, or for individual departure from recognized standards of behaviour, the more effectively can the total energies of Society be canalized in desired directions.

On the other hand, if Society is to remain healthy, progressive, and able continuously to draw fresh life from its members, it is necessary that the whole tone of administration and of public opinion should encourage individuals to be virile and adventurous in thought and action, possessing initiative and made anxious to use it for the public good, from a sense of belonging rather than by compulsion.

Both sets of conditions are desirable, but they are conflicting. Any co-ordinated system of social organization likely to give a measure of general satisfaction will involve compromise on both sides. For achieving the best system there is no pattern or rule that is universally applicable. It has to be achieved afresh at different times in every country and arises out of current social conditions. All of them necessarily place restraint on individual behaviour including, occasionally, behaviour which the agents regard as a necessary expression of moral principle. The extent to which this restraint is necessary varies inversely with the degree of homogeneity within the society concerned. The degree of homogeneity that is possible at any particular time depends, *inter alia*, on the knowledge, character, political experience and the attitudes of mind inherited from their political past, which are to be found among the individuals which compose the society. One condition is constant. Every government must take cognisance of public opinion, especially of the depth of feeling which it displays on particular issues. This remains true whether the government aims at democracy, in a wide sense, or at government by a party, or by a section of the community. For this reason every government tries to influence public opinion in desired direction, some by means that are honest and open, and some by means that are dishonest and secret.

This (in over-simplified form) is the complex situation into which the individual is born, and in which his moral urge has to function in a way that will maintain the integrity, and express the quality, of his own being.

Freedom is a word that has no meaning except in some specific context in which conditions are expressed or understood. There is no absolute freedom. Everything that lives is conditioned by the data which the universe presents to it, in interaction with which it has to maintain and express the qualities of its own being. The moral consciousness of the individual is first experienced as part of a complex personality in which there are many impulses and desires that conflict with it, as well as some which harmonize with it. In the process by which these are integrated (so far as they are integrated) and expressed in the behaviour of the whole being it is involved in a struggle that is difficult, subtle, and continuous. The struggle becomes more complex and difficult as the individual moves through a widening range of social relationships, and experience of social responsibilities. For this process the individual necessarily experiences periods of mental conflict, confusion and doubt. He meets with the necessity of forming judgments and making decisions with only a limited knowledge of the factors involved.

This is the moral situation as it comes into experience in every phase of culture from the most primitive to the most advanced. It is more complex in

advanced cultures than in primitive, but the difference is one of degree rather than of kind. It provides the setting to which any moral philosophy has to be applied, and in which its principles will be tested. The moral judgment is as imperative in its demands, and as irresistible in its sanctions, among the ignorant and lowly as among the wise and subtle, though both its demands and its sanctions may take different forms in different circumstances.

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NEW BOOKS

Human Law and the Laws of Nature in China and the West. L. T. Hobhouse Memorial Trust Lecture No. 20. Delivered on May 23, 1950, at Bedford College, London. By Joseph Needham, F.R.S. (Oxford University Press, London, 1951. Price 2s. 6d.)

Perhaps the greatest difference between Chinese thought and ours is the absence in China of our conception of law. That country has indeed had "laws," but until quite recent times, when the Chinese Republic adopted occidental ideas, Chinese "laws" have been merely suggestions to the bureaucrats who ruled China, concerning how they should deal with the common people and have not been prescriptive orders to be obeyed by all. We have been taught that the concept of formal law arises from the universally innate notion of natural law. Then how did the Chinese fail to have this notion?

Dr. Needham has attempted to answer this question, giving three reasons: (1) Chinese tyrannical Legalists made the notion of law distasteful. (2) Their bureaucratic government made only *li*[a] (natural law) suitable to Chinese society, not formal law. (3) The notion of a supreme personal being disappeared so early that the Chinese did not conceive of a celestial law-giver formulating abstract laws for his creation.

Dr. Needham has performed a distinct service in presenting this problem. His answer is interesting, whether we agree with it or not. For we cannot really understand our own ideas until we place them against the background of ideas that are different from ours. Then it is important to study and understand Chinese conceptions.

The importance of this lecture lies here, rather than in the earnest attempt made to answer this problem. For what is here said may easily be challenged. This history of Chinese thought has not yet progressed to the stage in which one can dispense with a prolonged study of the original sources.

Dr. Needham seems to have failed to notice that Confucius, who lived before Chinese Legalism had been formulated, was the crucial thinker who biased China against formal legal enactment, saying that merely leads it to evasion.[1] It is also debatable whether *li*[a], which Dr. Needham equates with natural law (p. 24), ever had that precise meaning. In the time of Confucius, it denoted merely a gentleman's code of conduct. One of the oldest chapters in the classical *Li-ji* (the *Record of Li*[a]) contains this important statement, "*Li*[a] does not apply as far down as the ordinary people and the penal laws (*hsing*) do not apply as far up as the grandees."[2] In Han times, *li*[b] (Needham's "principle of organization") was indeed equated with *li*[a].[3] He restricts himself to one interpretation of *li*[b] in the thirteenth century A.D. The conception of a single supreme personal God was moreover current in the formative period of Chinese thought. It is at least as old as the Duke of Jou (eleventh century B.C.) and was almost surely held by Confucius, certainly by Mo-dz (fourth century B.C.). Not until the great Daoist philosophers and the Confucian Sün-dz (fourth and third century B.C.) was this conception overthrown for Chinese intellectuals. The development of Chinese thought was not as simple as Dr. Needham seems to think. It is unfortunately necessary to wait until Chinese philosophy has been adequately investigated before we attempt to discuss such interesting problems as that he raises.

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[1] *Analects* II, iii.

[2] My translation. Legge's is found in his *Li Ki*, "Sacred Books of the East," vol. XXVII, p. 90, verses 50–1.

[3] *Ibid.*, vol. XXVIII, p. 275, verse 10.

The Works of George Berkeley. Vol. IV. Edited by A. A. Luce. (Nelson. 1951. Pp. viii + 264. Price 30s. net.)

Pursuing his devoted task of editing (with Professor Jessop) the complete works of Berkeley, and of repairing the deficiencies and omissions of Fraser's edition, Professor Luce has collected in the present volume Berkeley's writings on physics, mathematics, and natural history. Physics is represented by the *De Motu* (1721), in which Berkeley attacked what he took to be Newton's doctrine of gravity with its presuppositions of absolute space, time, and motion, and argued that general terms such as "gravity" were only intelligible if taken as compendious ways of referring to a variety of observable phenomena.

The greater part of the volume is taken up with Berkeley's mathematical writings, criticizing the notion of the infinite divisibility of a finite extension. Berkeley's views which had already been adumbrated in the *Principles* (§§ 123–34) were further developed in the *Analyst, A Defence of Free-Thinking in Mathematics*, and *Reasons for not Replying to Mr. Walton's "Full Answer,"* which were published in 1734 and 1735. Professor Luce also includes the early and very brief paper *Of Infinites* in which Berkeley first put forward his view, but which was never published in his lifetime. Professor Luce, by tracing detailed parallels between it and entries in the *Philosophical Commentaries* (if so we must rename the *Commonplace Book*) is able both to date its composition fairly closely to the end of 1707, and to dispose of Fraser's somewhat disparaging treatment of it. However, Fraser did well to point out that Berkeley had not yet modified his image theory of meaning, and to contrast it with the *Analyst*, in which the operational theory, indicated in the *Principles* and developed in *Alciphron* is brought to bear, in order to show that the statements of religion need be neither more nor less mysterious than those of mathematics. "He who can digest a second or third fluxion . . . need not . . . be squeamish about any point in divinity."

The volume, which concludes with Berkeley's first published work, *Arithmetica and Miscellanea Mathematica*, and with a quartet of writings on natural history, among them the graphic *Description of the Cave of Dunmore*, is as handsomely printed and bound as its three predecessors.

A. D. Woozley.

Contemporary Ethical Theories. By T. E. Hill. (The Macmillan Co., New York. Pp. xii + 368. Price 30s.)

This book is the fruit of a great deal of study and provides a valuable storehouse of information about present-day ethical theories, which are succintly and on the whole very well summarized. The word, contemporary, must be taken fairly strictly, all the authors discussed, I think, either being alive or having died not earlier than the thirties with the exception, for obvious reasons, of Karl Marx. Within these limits the work can be regarded as pretty comprehensive and should be acquired by anyone who wishes to obtain a quick idea, as far as he can get it from a short summary, of where any particular ethical writer of any importance stands. It is more difficult to decide whether it is suitable to be used as a textbook for classes as well as a book of reference, because the summaries of the theories have from the nature of the case to be too brief to do full justice to any of them. This is not so much a criticism of the author as a reflection on the inevitable disadvantages of a book of that kind, which make most teachers in this country at any rate object to prescribing as textbook a history of philosophy.

The author is judicious and interesting in the relatively short comment he allows himself, if not very original. He is definitely in favour of a non-natura-

listic view, but much the larger part of the book is occupied by a discussion of theories which might be called naturalistic. In a few cases the limitation of space under which he labours has led him into producing an account which gives no real idea of the philosophy of the author under discussion at all, e.g. it is futile to discuss Maritain's or any Thomist philosopher's theory of ethics without any reference to the whole system by which the natural is distinguished from the unnatural. At the other extreme, so to speak, I think the author ought to have given more space to Stevenson and similarly to C. I. Lewis, whose views are not at all adequately brought out. Incidentally he seems to me to differentiate the views of Ayer and Stevenson much too sharply: it may be that the former should be classed as an ethical sceptic in effect, but if so I think the same would apply to Stevenson, and they neither of them think they are ethical sceptics, and both try to avoid this charge in much the same way. One gap in the author's voluminous reading may be mentioned: it has apparently not come to his notice that Joad has long ago changed his views so far as to adopt a non-naturalist view of ethics, and this leads up to the more general criticism that he fails commonly to note the changes of view in authors as between their different books. But on the whole, I think, his work is well done.

A. C. EWING.

The Vindication of Metaphysics; A Study in the Philosophy of Spinoza. By Ruth Lydia Saw, Ph.D.(Lond.). (Macmillan & Co., Ltd., 1951. Pp. 173. Price 12s. 6d. net.)

Miss Saw subentitles her book *A Study in the Philosophy of Spinoza*, which is not quite the same thing as a study *of* it, and her aim is not so much to expound the doctrine of Spinoza for its own sake as "to make Spinoza 'say something' to ears accustomed to the modern idiom." For she finds that present-day students of philosophy "can make nothing of the language of Spinoza"; and though she thinks this to be "natural enough" it seems to me that it suggests something seriously wrong with the current teaching of "history of philosophy" (which still finds a place in curricula), seeing that Spinoza's language is clear and forceful, and nothing is required in order to construe it but close attention to his leading concepts, unbiased by more recent but less critical ways of thinking. Whatever may be the wisdom and the result of an endeavour to throw a bridge across the deplorable gulf between the older school of philosophers and the new by translating their thought into the "modern idiom," it is all to the good that one herself trained in the latest manner, eschewing the too common fashion of disguising in a Lockian motley, thinkers so unfortunate as to have been born before the advent of Lord Russell and then, taking the motley for the man, finding him to be fit only as an awful example of how not to philosophize, should try to establish relations with Spinoza himself, as no man of straw fit only to be a target, but an active opponent, and not unarmed. This is all to the good, I say, even though anything in the nature of an eirenicon would seem to be a forlorn hope. So far as this book is concerned the "hope" remains largely "forlorn," for in the picture which Miss Saw gives of the thought of Spinoza there remains still a good deal of "straw" impoverishing the living doctrine—perhaps because her reading of the philosopher (and unlike many facile critics she *has* read him) is darkened by guidance provided by most of his English expositors and critics.

But the author's intention is not simply to express Spinoza in the "modern idiom" (nor to any important extent does she seem to me to succeed in so doing), but, as the main title indicates, it is to "vindicate metaphysics" against the extreme modern view that it is "without sense," mere "sound and fury signifying nothing," and against the no less fatal suggestion that its "sense" is not

epistemic but aesthetic, beautiful theory without basis in ugly facts. These views are both summarily rejected by Miss Saw: the former on the ground that "the theory that 'metaphysics' is impossible is not a definitive theory about all theories, but one possible theory among others" (p. 11) (i.e. is itself a metaphysical theory); and the latter on the ground that "the very form in which this opinion is expressed is self-refuting" (p. 7) since to pretend to be a work to be judged epistemically while in fact being a work of art having no more than aesthetic value is to be an artistic failure (i.e. to lack aesthetic value).

Another view of the philosophies of the past considered by the author (though less abruptly) is that as the "mother of the sciences" not all of which had become independent specialities, philosophy remained the matrix of their inchoation, and that even to-day parturition is not complete, so that contemporary philosophies should remain "salads" composed of more or less inchoate ethics, political theory, psychology and theology, duly sliced in accordance with the fashionable recipe. On this view philosophy *proper*, past child-bearing, would have no subject-matter, and though no Hecuba "forsaken and forlorn," would survive as a mere technique. The old mother, powerless to inform, would ceaselessly mutter to her children: "Take care, take care." I am not clear whether Miss Saw does or does not accept this broad view, but it is evident that she holds that actual philosophers to-day (not perhaps *qua* philosophers) ought, pending the arrival of qualified specialists, to "do" at least ethics and theology as well as cultivate the philosophical technique, as thinking men of good will still bearing the burden.

It is with the manner in which the philosopher "does" ethics and theology, and in particular with the manner in which Spinoza is said by the author to "do" them, that I find ground for serious question; and this is indeed the central thesis of the work. I cannot but think that Miss Saw is prone to confuse Spinoza's doctrine of prophecy in the *Tractatus Theologico-Politicus* with his doctrine of knowledge in the *Ethics, etc.*—the former being in a manner "pragmatic," the latter plainly speculative. That the two doctrines are linked is clear enough: prophecy being a form of "free imagination" (*Eth. II*, xvii. *Cor. Sch.*) which is no defect in the mind, and which is not to be tested by reason but, as Miss Saw rightly says, "by the excellence of the life to which it lends support" (p. 17), while speculative thought is rationally founded, tested and established, and is related to "imagination," free or otherwise, as adequate to inadequate knowledge.

"In working out his moral theory," says Miss Saw (p. 137), "Spinoza is speaking as a moralist and not as a philosopher," "he knows what is the best life, and is giving clear reasons for his knowlege." But the reasons are not speculative: the moral theory is not derived from the metaphysics, though it is in accord with it. The moralist reflects upon his beliefs as a *practical* moralist, and Spinoza perhaps reflects more profoundly in the light of his metaphysical theory of the nature of man, his place in society and the universe, and his relation to God, but what he reflects upon is the gift, not of theory but of practice. For it is by practice that we get satisfaction, and by reflection upon practice that the means of true and permanent satisfaction are certified. I do not wish to deny that there is truth in this account, but it is certainly not the whole truth. The truth that *is* in it arises from the nature of the moral life as essentially durational; its defect lies in the failure to realize that durational struggle is incomprehensible save as a privation of eternal action if the struggle is "moral" in any deontological sense of the term. For this it is not enough that the gift of practice should be reflected upon in the light of metaphysical theory about God, man and universe, and their relations; the very *direction*

of the emendation of human life must be determined by these natures and relations, knowledge of which is metaphysical; and there can be no manner of doubt that this was the aim of Spinoza himself. That durational practice asymptotically approximates to eternal theory is no "accident," but the very ground of morals.

Miss Saw advances a similar "pragmatic" view of theology. Here she makes the curious statement that "theology has not been claimed by specialists, at least to any great extent" (p. 11), which suggests that she is about to use the term "theology" in a restricted sense (e.g. natural, or perhaps rational, theology), but there is little further sign of this in the course of her discussion, which ranges widely. Perhaps for the moment she was thinking of the "theology" that forms the subject of the last chapter of the second series of many courses of *Gifford Lectures*—introduced presumably to satisfy the trust deed. As to the possibility of "doing" theology, the author is of the opinion that to argue that since theology is at once, like mathematics, deductive knowledge, and also, unlike mathematics, knowledge of existence, it must be wrongly taking "existence" to be a predicate, is "far too simple-minded a way of dealing" with theologians, since "objects cannot be juggled away with words" (p. 16). Belief in the existence of God is not itself the result of deduction but the gift of inheritance, revelation, or mystical experience—very much as belief in sense-data is the gift of observation. She even goes so far as to suggest (p. 16) that the effect of pointing out this logical blunder to the theologian may be to lead him, not to abandon his doctrine but to believe that he is, in fact, deducing the existence of God from the conception of God, and that the supposed blunder does not occur. Spinoza in particular, she says, "could not have used the language 'existence is a predicate,' but I think it is clear that he thought that it was" (p. 16). It passes my comprehension to understand why Spinoza *could* not have used language already suggested by Gassendi (*"Quod existit, pluresque perfectiones habet, non habet existentiam ut perfectionem singularem, unamque ex eo numero"*), and all but used by Descartes (*"Non video cujus generis rerum velis esse existentiam, nec quare non aeque proprietas atque omnipotentia dici possit, sumendo scilicet nomen proprietatis pro quolibet attributo, sive pro omni eo quod de re potest praedicari"*) (*Cf. Meditationes, Obj. in Med. V. 2 et Resp.*), nor why it should be supposed that Spinoza accepted the interpretation commonly assigned to the reply of Descartes by those who neglect the comparison of "existence" with "omnipotence" (which is not an attribute like "tall"). For Spinoza *"posse existere potentia est"* (*Eth. I. xi. Dem.*), so that existence is the actuality of that potency, and not a property superadded to the essence. And this is true both of existence as eternity and existence as indefinite duration (the two species of actuality), neither is a property superadded to an actual essence, but each is the actuality of the potency thus actualized as determinate essence: eternity that of the self-actualized potency (*causa sui*), indefinite duration that of the imaginational potency experienced as *conatus* (*Eth. III. vii*). Nor are these mere technicalities that can safely be ignored in a popular account of the doctrine of Spinoza. Not to realize their significance is to falsify the very roots of the doctrine, and to become inevitably involved in all the trite difficulties about mechanism, determinism, finite individuality, and so forth and so on. Spinoza the activist cannot be read in terms of the "radical objectivism" of the empiricist heresy.

It is to be feared, then, that the author's well-intentioned, and so far as it goes well-sustained, attempt to expound Spinoza in the modern idiom is infected with this misreading of the philosopher; and though she is by no means unaware that there is something wrong about it, her method of setting

it right lies in giving a "pragmatic" account of those features of the doctrine that carry conviction of some sort to her own mind and yet plainly cannot be concluded from the objectivistic misreading of Spinoza's fundamental activism. Thus, though she understands well enough that for Spinoza "knowledge (know*ing*?) is the healthy activity (act*ion*?) of the mind, truth is the property (*actus*?) of the ideas which the mind forms (enacts?) when it is thinking well, and it is immediately recognized" (p. 34, parentheses mine), she yet does not appear to see that this implies that the much laboured distinction of description-, or conception-, statements and observation-, or existence-, statements, however *logically* valid and important, must on Spinoza's principles be given no direct, or "one-one," *epistemic* application. No *merely* observational or existential statement can be true in Spinoza's (or Descartes's) sense of the term "true," and all true statements are truly descriptive or conceptual, i.e. describe or define the real, viz. what exists. "God exists" has truth-value only in so far as the nature of God is rightly conceived (for "God" is not a proper name) and thus affirmed, and this can be expressed only in a statement that is descriptive or definitive. If this statement is *true*, then God, as so defined or described, *exists*—for "truth" is *about* the real. How it is to be *shown* to be true is another question, and plainly neither the principle of correspondence, nor that of coherence, will avail: the one because it cannot be used, the other because many fictions are coherent (for the additional criterion of comprehensiveness cannot be applied by the human mind, save relatively). Miss Saw takes a pragmatic view: it is true in so far as it works in a special way in practice. "Spinoza puts up a very good case for the position that belief in the existence of God is a powerful causal factor in good behaviour and happiness" (p. 20). It may well be doubted whether it would have this effect if it were not a belief that is true in some more fundamental sense than productive of good behaviour and happiness. The practical man, merely as such, may not be immediately concerned with this sense, any more than the scientist need be concerned with the real nature of things as they are in themselves, but for the philosopher *qua* philosopher it is the object of proper and essential inquiry, not to be avoided by concentration upon the question of diagnosis. For man *qua* practical, belief is sufficiently verified by success; for man *qua* scientist, it is sufficiently verified by reference to "facts" expressed in observation-statements; but what *is* true "practical success," and what *is* genuine "fact," can be established only by recognition of "truth" which is not thus sufficiently verified. And the elucidation of this falls to the philosopher whose interests transcend the satisfactions of practice and the *als ob* of science. This is not the place to expound Spinoza's account of philosophic truth—suffice it to say that for him the "true idea" is the "adequate" idea, the idea in which the mind is active without hindrance (*Eth. III. i*); it is the idea that does what it claims to do—that is *ad-aequate* or equal to its task, the *actus* of which (i.e. knowledge of its overt object) actualizes the potency of the mind itself as the *essentia objectiva* of the body *et nihil aliud*, i.e. of the body as involved in the *facies totius universi* without loss of individuality in the eternal community of *Deus sive Natura*.

How then do these principles apply in the sphere of theology? Miss Saw argues that Spinoza does not really seek to prove that God exists, for even apart from his arguments he does not really doubt it; "the 'proofs' of the existence of God really consist in the exhibiting, in different ways, of the intellectual absurdity of raising a doubt as to his existence" (p. 63). We may agree that he does not deduce the existence of God either from a mere conception entertained (in the first three proofs), or from any other existence (in the fourth proof, as he himself points out—it is *a posteriori* only in form).

Criticisms based upon these suppositions, as the author rightly says "completely ignore Spinoza's theory of knowledge," but she adds, "the difficulty is that to grant him his theory of knowledge is to grant his proofs of the existence of God" (p. 64). This would certainly be a "difficulty" if the theory of knowledge had no sufficient foundation, and if the existence of God were a deduction from it, but it can hardly be seriously suggested that either is the case in the mind of Spinoza. The principle that underlies both the epistemology and the theology of Spinoza, and indeed his whole philosophy, is that to be "real" is to be an eternal *agent*, and that God, defined as absolutely perfect eternal agent, is real *par excellence*; while the "true idea" is the actuality of the mind's unhindered intrinsic potency accomplishing its task of apprehending the real. It was by no mere chance that Spinoza placed the definition of *causa sui* (i.e. self-actualized potency) at the head of *Ethics I*.

"From the point of view of a modern theory of knowledge," says Miss Saw (p. 66), "all these proofs (of the existence of God) beg the question." So much the worse for the modern theory of knowledge. No doubt this theory has the "great advantage" of being in accordance with common sense—an advantage, I should say, limited to its propaganda-value among "those who gather themselves together for discussion at philosophical congresses" (to quote the author's naïve identification of "philosophers" (p. 12)). Common sense is a good servant, but a bad master in philosophy.

Now in her interpretation of Spinoza (if I understand her aright—and I do not find here that brevity and precision that is claimed for the "modern idiom") Miss Saw wishes to substitute, especially in the field of theology, for this "modern theory of knowledge," not the theory that I have briefly sketched but one for which inherited beliefs, whatever may be their origin or mode of development, are true in so far as (1) they provide an orderly and self-consistent world of objects and events (including all those which must be accepted as indubitable), and (2) they so affect the mind as to provide a better behaved and happier life for the believer (and through him for his fellows). Thus, with respect to (1), just as the historian of the Norman Conquest cannot suppose that there was no such person as William the Conqueror (for the supposition would "shake the whole mass of events too much" (p. 70)), and does not, therefore, need to "go out and look for (William) in the appropriate places" in order to be assured of his existence—so also "not a single event, nor a single property of a single thing, can be understood adequately without reference to . . . God" (p. 71) whose existence is thus as indubitable as all or any of these events and properties. To be convinced of this it is only necessary to stop thinking "in watertight compartments," and to take the amplest view.

So far there seems to me to be involved no rejection of the "modern theory of knowledge," but only its more thorough application—with the distinction, perhaps, that "inherited beliefs" are preferred in theology to the *ad hoc* imaginative hypotheses chiefly used in the sciences. Theological beliefs and scientific hypotheses are alike to be verified by reference to events and data observed, and expressed in existence-statements. But this is not all, for according to (2), theological beliefs thus verified have an influence on the mental life of the believer: "belief in the existence of God is a powerful causal factor in good behaviour and happiness" (p. 20)); and this is their pragmatic verification upon which Miss Saw places the chief emphasis. I do not think that even this, however, modifies the suggestion that the method of theology is the scientific method, for however it may be ignored by the textbooks, successful scientific investigation is also a "powerful causal factor" in good scientific behaviour, and makes the pursuit of science a happy one. In both

cases the reasoned argument concerning the world is matched by an empirical test in the mind of the thinker. True, the scientist may be a bad man, and theological beliefs have a more ample influence on life than do scientific beliefs, but the principle seems to be the same.

How all this squares with the account given in chapter 2 of Spinoza's method cannot here be discussed: "the one perfectly satisfactory idea . . . the idea of perfect being . . . is both the ground for all knowledge and the instrument for progress in knowledge" (pp. 39–40); true ideas are those "the mind forms when it is active" (p. 42) and not subject to passion; hence "the method of acquiring knowledge is to order our lives in such a way that there are no emotional obstacles to the quiet and calm contemplation of the ideas we already possess" (p. 42). But it is one thing to say that the absence of passive *affectus* is essential to the acquisition of truth (which admittedly excludes them), and quite another to say that beliefs that produce good behaviour and happiness (i.e. active *affectus* or "exertions") are thereby verified. The *test* of truth must not be confused with the *nature* of truth (A-propositions cannot be simply converted): the belief in hell-fire has often made for good behaviour, and even happiness of a sort, but this does not make it true; nor therefore can the good effects of a belief in God be the source of *its* truth. The true idea is the *adequate* idea, the unhindered intellectual action.

I have left no space for useful comment upon the detailed account of Spinoza's thought concerning God, the world, and man which occupies the middle chapters of Miss Saw's thoughtful book, and must restrict myself to laconic notes. At the following statements I think there is reason to cavil:

"The whole frame of the universe is God's body" (p. 74). In view of Spinoza's assertions in *Eth. I xv. Sch.* and *Eth. II Def. i.* the author's explanations do not redeem the phrase "God's body."

"Substance is the absolutely concrete whole, not the subject of attributes but the subject with its attributes" (p. 75) and many other similar statements *passim*. This confuses the universe with the infinite indeterminate potency which it determinately expresses. It involves the confusion of "substance" with "stuffs."

"Thinking and extension are two aspects of the same thing" (p. 76), together with the repeated assertion that "mind is the inner side of the body." These spatial and visual metaphors are either useless or positively misleading.

"Modes have finite existence—that is they have a date and place within the universe" (p. 83), which implies that the essence of finiteness is temporal localization, so that no finite mode can be eternal, and no mind non-spatial. It also substitutes dating for duration.

"If every event, including human action, is completely determined . . . then, on the surface, it is hard to see how things can go wrong. It appears to arise from the habit-forming tendency of organisms that they may sometimes respond inappropriately" (p. 117). Are not the "habit-forming tendencies" also determined? A better solution than this must certainly be sought.

"If the mind remembers nothing (after death) it is clear that the ordinary notion of our being restored to friends who have died before us is inapplicable" (p. 129). The "ordinary notion" is, of course, inapplicable, but "in eternity there is no when, before, or after," and thus no call for memory.

"Spinoza . . . would not admit . . . the distinction between a thinking mind and its object; (minds) are made up of states which are fleeting . . . (as) correlates of bodily states, and eternal if there is no bodily state which is its adequate correlate" (p. 132 *et passim*). What Spinoza *says* is that a mind is *in se quid reale, et omnino diversum* from its object, that it is not composed of "states" but of knowing *actions*, and that there is no mind that is not correlated with

its corporeal object, viz. the body *et nihil aliud.* It is true that he speaks of matters "which pertain to the duration of the mind without relation to the body" (*Eth. V. xx. Sch.*), but here *caveat* must be entered, not against the use of the term "body" (which plainly means the imaginational body of "this present life," and not the mind's eternal object) but against the term "duration" as applied to the mind's "eternal part"—and this again may be defended on the ground that in "this present life" this is but a "part" of the mind, and is, experienced through its relation with the other parts, not as eternal blessedness but as "a joy continuous and supreme to all eternity" (*De Intell. Emend.*, §. 1).

"Either the events have been rightly understood at the time, and the understanding mind is, so far, eternal, or that state of error has gone by for ever—that is, it is in its eternal place in the scheme of events" (p. 134). A treatise might be written on the confusions of thought implicit in this statement; here I can only invite the author to re-examine her ideas with an unbiased mind. She will then not seek to interpret Spinoza on a foundation of concepts peculiar to a pulverulent event-philosophy altogether alien to his thought.

I will add that the common translation of the term *affectus* by "emotion" is to be deprecated as suggesting a state rather than a disposition.

My space is exhausted, and I can only commend this small volume, full as it is of "wise saws and modern instances," to the notice of students trained in the "modern idiom" to be contemptuous of metaphysics (and it is to these that it is addressed), as well as to all who have so far been content with a "pigeon-hole" acquaintance with a philosopher who has yet to be adequately respected as a profound teacher. To the author I offer congratulations on her courageous and well-sustained sally out of the positivist stronghold under danger of wounds and capture by the barbarians without.

Though this is not a book with which one is so bored as to notice misprints, the following have caught my eye: p. 10, last line—"philosophers"; p. 41, line 16—"grounds" should be singular; p. 47, line 7—"first" should be "third"; p. 80, lines 33 and 37—"*universiae*" should be *universi*, and I note that Miss Saw persists in the common mistranslation of *facies* by "face" (suggesting the superficial aspect of the world) instead of "fashion" or "make" (*facio*). The real "structure of the whole universe" must not be confused with the "common order of nature."

H. F. HALLETT.

In Defence of Philosophy against Positivism and Pragmatism. By MAURICE CORNFORTH. (London: Lawrence and Wishart. 1950. Pp. xv + 260.)

Sense-data or atoms? Philosophy is traditionally synoptic and, from Thales to Carnap, philosophers have tried to answer the question: "What is Reality as a whole? What is the fundamental stuff of which everything is made? What is the ultimate furniture of the Universe?" In recent years this question has become: "What is the correct language for Unified Science?" But the question is still the same, and those who claim to answer it seldom ask themselves whether it is a genuine question at all. Lenin said that "the contending parties . . . are essentially idealism and materialism." Historically he was right; but was he right in assuming that one of the contending parties was correct and the other mistaken? Mr. Cornforth follows him, and with some justification, since the same assumption is made by his opponents. His criticisms are cogent as far as they go; but simply because they make this assumption they do not go far enough, and I hope to show that the same criticisms can be directed against Mr. Cornforth's own materialist thesis. Sense-data or atoms? It is a battle of Whale and Elephant, since each side can defeat the other on its chosen ground.

Three of Mr. Cornforth's arguments seem to me to be wholly convincing. (*a*) The Positivists have not made good their claim to avoid metaphysics; it keeps creeping in. (The reason seems to me to be that the attempt to reduce everything to a single category, whether ideas, impressions, matter, sense-data or experience, just *is* metaphysics.) (*b*) In spite of their ingenuity they are inevitably subjective idealists. The attempt to make sense-data "neutral" fails and, for all their "powerful logical techniques," they have not advanced a step beyond Hume. (*c*) By employing a rigid criterion of significance they restrict the possibility of knowledge in an arbitrary and disastrous way.

So far so good. Where Mr. Cornforth fails is in his lack of sympathy for his victims. Both Positivists and Pragmatists talk queer. Like Berkeley, they appear to deny the reality of ordinary things. But why do they do this? No doubt Mr. Cornforth would give an answer in terms of the ideological superstructure that arises at certain stages in the development of society. But, though much that he might say on this head would be both true and enlightening, I do not think it would get at the heart of the matter. Even if we are convinced that the cry: "Back to observation" leads to absurdities, we must try to understand why this cry has gone up and what other absurdities it was intended to avoid.

The answer seems to lie in the fact that, at least since Descartes, philosophers have been impressed by a contrast between those studies that have found "the sure path of a science" and those that present a sorry spectacle of grandiose structures in ruins. Empiricists try to avoid talking what will look to future generations like nonsense; and the obvious way of doing this is to start with a rigid criterion of significance. What is wrong with speculative systems, they say, is that no evidence can be produced for or against them. But here a contradiction arises. To avoid nonsense we must stick to observation. All significant speech can be reduced to assertions in the form: "Blue patch at time t and place p" interspersed with generalizations that require "postulates that the philosopher can neither justify nor do without." Perhaps the best chapter in the book is that in which Mr. Cornforth shows that Carnap's colossal structure based on "individual constants, predicates of degree 1 and predicates of degree 2" is just another supermetaphysics, and an idealist one at that, and just as restrictive as the older systems.

Sense-data or atoms? Must we really choose? Is it not possible that this is a question like: "When did you stop beating your wife?" to which no direct answer is correct? From Thales to Carnap, philosophers have made use of the model of the encyclopaedist or compiler of catalogues. Knowledge has been thought of as a record of all the things that there are, together with their relations. But in what language shall this book be written? "Space-time designations," says one; "ideas," says another; "impressions," "sense-data," "atoms and the void"; and so it goes on. But what is needed is not a new answer or new arguments in favour of one of the old answers, but a revision of the question. Perhaps the model of the recording angel is wrong. And many modern schools of philosophy substitute a new model, that of the craftsman. The pragmatists, Professor Ryle, the apostles of Ordinary Language, the Existentialists, all in their different ways have gone over to the model of the craftsman. Knowing is now seen to be, in Dewey's phrase, "what some of the actual existences *do*." Man is not an angel contemplating and recording the world from outside; he is in the world coping with it, and he copes with it partly by means of abstractions or concepts or words. (At this very general level it matters little which of these we choose.) In studying the Theory of Knowledge we must not start with questions like; "What is everything made of?" or (to put the same question in the formal mode), "What is the correct

terminology for Unified Science?" These questions belong, if anywhere, at the end; and to start with them imposes restrictions as to the future of science that Mr. Cornforth rightly holds to be unwarranted and disastrous. On the "recording angel" theory of language the scientific knowledge of the future may be unlimited in the trivial sense that there may be an infinity of future sense-data or movements of atoms to be recorded; but no genuine growth is possible, since the form of all future science is fixed by the initial choice of terminology.

But if we approach the Theory of Knowledge on the craftsman analogy we shall avoid this and other evils, by beginning with the actual schemes of concepts ("languages" if you like), used in different concrete situations by actual human beings; and we shall recognize an existing language for what it is, an historical growth in which the meanings of the words are connected with past meanings but are not static. It is a commonplace that, as science advances, the very meanings of the words it uses undergo a change.

Now the first philosophers to substitute this dynamic approach to the Theory of Knowledge for the old static approach were undoubtedly Hegel, Marx and Engels. But, by a tragic irony, it is these very philosophers who showed us the way out who now constitute the greatest barrier to progress. For their followers insist on the restrictive terminology of "interconnections and laws of motion of the objective world." It was, perhaps, inevitable that Marx and Engels should have made this mistake. A great philosopher sees what is wrong with the methods of his own and previous generations and points the way out; he is seldom able to emancipate himself altogether from the trammels in which he has been brought up. But it is inexcusable that, in the twentieth century, Mr. Cornforth should make the same mistake. In spite of his recognizing the relativity of thought to language and the historical growth of the latter, he insists that knowledge "reflects" an "objective reality" and that this objective reality consists of matter in motion. But there is a difficulty here.

If we take any particular set of concepts (for example, those of Newtonian science), we can get outside them and question their adequacy. To do so we must use other concepts; and this is precisely the way in which science grows. But we cannot get outside concepts altogether and, from a vantage point in logical space, ask questions about the whole of human knowledge, for example whether it does or does not "reflect objective reality." To suppose that we can is to make the old mistake from which the Marxist approach ought to have saved us. Our knowledge is conditioned through and through by the concepts that we use at any particular stage and we are never in a position to compare our system of knowledge with something called "reality." And to admit this is not to say that the real world is mysterious or unknowable, a conclusion which Mr. Cornforth foists onto the positivists. What they say is that such an assertion and its denial are equally meaningless, because to ask this question implies the possibility of comparing "knowledge as a whole" with "reality as a whole," which simply cannot be done. (Not because it is beyond our powers, but because it is a logically self-contradictory demand.) That lions are real and unicorns fictitious is true enough; but to say that the world is real is to make a logically improper generalization. There are concrete situations in which it is prudent to admit that lions exist, are real, are not dependent on us or our concepts, belong to the "outside" world. And these propositions are true in the plain straightforward sense in which every one who is not mad would admit them to be true, true in the sense in which "Unicorns exist" is false. But what are we to say of the proposition: "The objective world exists"? If this is just a compendious way of saying: "Lions

exist, tigers exist . . . etc. . . .'' it is useless, but comparatively harmless. But both positivists and Marxists seem to me to have failed to see that the questions of truth and meaning which arise in the case of very high-level generalizations are not the same questions as arise in the case of particular propositions. Roughly speaking the criterion of the adequacy of a very general system of concepts is a pragmatic one, that of particular propositions couched in certain concepts a correspondence one. Within the system of Newtonian science it is either true or false that Mars is at a certain point in space. Sanity demands that we agree with the Marxists and all other realists here. But the question: ''Is Newtonian science true?'' is not a question of the same type at all. It would be better to ask: ''Are the concepts of Newtonian science adequate?'' to mark the difference.

Mr. Cornforth rightly recognizes the historical growth of languages and their dependence on specific human activities, and he rightly castigates some positivists for trying to treat of language in abstraction from its social roots. But I do not think that he can at the same time hold that our knowledge can ''reflect objective reality.'' How can we tell whether it does or not? To do so requires a comparison between our conceptualized knowledge and an unconceptualized ''objective external world,'' and this in turn involves the heresy of ''pure observation'' which underlies all empiricist and positivist theories. This difficulty becomes most acute in Mr. Cornforth's treatment of Dewey. Dialectical Materialism and Dewey's version of Pragmatism have much in common and Mr. Cornforth gives Dewey credit for treating knowledge naturalisticly and ''for insisting that ideas are tested—verified—in practice, and not by a contemplative comparison with some 'given' reality, such as was imagined, for example, in Wittgenstein's theory of verification and truth.'' Yet he fails to see his own materialist thesis involves just such a comparison.

His criticism of Dewey is also effective. Dewey speaks as if the correspondence required is not between ideas and objective reality but between ideas and successful practice. And Mr. Cornforth pertinently comments: ''In the same way, presumably, a traveller . . . who studies the map of the underground railway system with a view to reaching some destination must not regard that map as corresponding to any 'archetypal' tunnels 'antecedently' existing beneath his feet. He is simply to regard it as a plan of action, which many citizens have found useful and in which he, too, may repose confidence.''

Now a man who thinks that Piccadilly Circus station does not exist before he enters it is certainly a subjective idealist and needs psychiatric treatment. But the very obviousness of this fact should have given Mr. Cornforth pause. Pragmatists, like Berkeley and like positivists, talk queer; but this indicates that they are grappling (perhaps unsuccessfully) with a problem, and their problem is not solved by the mere assertion that underground railways ''exist outside the mind and perceptions of men.'' To my mind, such assertions, instead of supplying the needed higher synthesis to the antithesis of idealism, are simply a return to the realist thesis. According to Mr. Cornforth, Dewey ''has confused the object of knowledge, the object which we know—which exists independently of our knowing it—with the account we are able to give of it in terms of the particular aspects of it which we have been able to investigate. The latter, of course, the account we are able to give of an object, only comes into being and only exists as a result of our own operations of knowing and is relative to those operations; but the former, the real object that is known, is not created by the operations of knowing it, but exists independently of those operations.''

Mr. Cornforth goes on to accuse Dewey of a radical inconsistency. Dewey claims on the one hand that we never throw the existence of the world into

doubt; but he "then explains that every known object exists only as a product of our own activity of thinking about it." This is cogent criticism; but my quarrel with Mr. Cornforth is that he commits exactly the same mistake. For what are we to say of such words and phrases as "objective," "matter," "external," "independent of us," "motion," the very things that pragmatists are accused of denying? These too are words; they belong to our language; they have their roots in its social history. Can we not argue that Mr. Cornforth's (and Lenin's) account of an object is itself relative to our operations of knowing. The dilemma is this: If we know these "objective realities," our knowledge of them, everything that we can say about them, is relative to our language, and this includes our assertion that they are "objective," "independent," etc.: And if we do not know them, reality is mysterious and unknowable. For all the powerful techniques of Dialectical Materialism we have not advanced a step beyond the position of Kant who was forced to assert the existence of Things-in-themselves and in the same breath to deny that anything could be said about them. The very arguments which show that positivism and pragmatism are only subjective idealism in disguise can be turned against Mr. Cornforth's version of dialectical materialism. How do we compare our conceptualized or abstract knowledge with "reality" so as to know whether it "reflects" it? Either we know this reality, in which case it is infected with the relativity of all knowledge or we do not; in which case reality is unknowable, and the comparison cannot be made.

And Mr. Cornforth's other main criticism of his opponents can also be turned against him. The sense-datum language or any other positivistic language freezes science at its present stage. But so also does the theory that the "objective real world" is "material" and that its laws are laws of motion. Just as positivist science is committed in advance to finding nothing but further correlations of sense-data, Marxist science is committed to finding nothing but further interconnections between material objects. No doubt laws of motion may change and develop. Dialectical Materialism is not committed to mechanism. But it is, apparently, committed to the final and absolute correctness of the categories of matter and motion. (There is an interesting parallel here to a similar situation in Marxist political theory. Both Hegel and Marx recognized dialectical changes in history; but both thought that they could predict the end of such changes. Hegel, the Conservative, froze history at the Prussian State of the present; Marx, the revolutionary, froze it at the Communist State of the near future.)

Much of this book is excellent. It is mainly a book of criticism, not of exposition, and much of the criticism is acute and cogent. When Mr. Cornforth argues, he often argues well. Unfortunately, however, he is not content to argue. The reader who is to learn from it must refuse to allow himself to be exasperated and side-tracked by the familiar techniques of distortion, emotive language and plain abuse; and this requires a patience and sympathy that Mr. Cornforth does not extend to his opponents. At every turn the argument is clouded by passages which read more like a Russian speech at UNO than a sober philosophical argument, and which will carry about as much conviction to anyone who is not previously convinced. Russell and Popper, for example, will be surprised to learn that they "join in a common propaganda of obscurantism, preaching the relativity of truth, the mysteriousness and incomprehensibility of the Universe." They certainly do not preach these doctrines, as any readers who are allowed access to their writings can discover for themselves. It may be true that their preaching involves these doctrines as logical consequences. But I have tried to show that a similar twist can be given to Mr. Cornforth's own thesis; and there remains the question whether these

tools of superstition and reaction are hypocrites or dupes. On the whole I am inclined to think that Mr. Cornforth regards them as dupes. That at least is the most charitable view. But, if their hearts are in the right place and their support of superstition and reaction is simply misguided, Mr. Cornforth should try to enlighten them. Abuse simply will not do, especially when it is accompanied by travesties of their views. One example of Mr. Cornforth's method will suffice. In *The Open Society* Dr. Popper subjected Marx's political theory to a temperate, sustained and rational criticism. He dared to suggest that Marx may have been wrong and he gave reasons for his opinions. They may have been bad reasons; but, whether good or bad, they should have been answered in the same spirit. Mr. Cornforth's comment is: "In this way does contemporary positivism embrace the contemporary conception of the struggle to the death of 'Western democracy' versus 'Communist dictatorship.'" To many of us this conception still seems to be correct. If we are misguided, Mr. Cornforth should try to help us, and one of the ways of helping us would be to expose the arguments on which this view is based. But this is a thing that communists seldom care to do. P. H. NOWELL-SMITH.

An Arab Philosophy of History. Translated and arranged by C. Issawi. (*Wisdom of the East*) (John Murray, London. 1950. Pp. 190. 6s.)

Scholars from the Near East cannot mention a big man without calling him great. Ibn Khaldun was a great thinker but his greatness is insisted on overmuch; not that Mr. Issawi is afraid of criticizing him. The introduction contains an outline of the life of Ibn Khaldun and sketches the main lines of his thought, telling the reader what he ought to know and what to expect. The selections from the *Prolegomena* are well chosen, rendered in readable English (the original may be called crabbed) and are a fair representation of the philosopher's thought. Some of the passages about geography might have been left out as the ideas are not peculiar to Ibn Khaldun and have no connection with his ideas, making room for something distinctive. Minor points in the translation might be questioned and the general editor should have kept an eye on the Latin. A. S. TRITTON.

Plato's Theory of Ideas. By SIR DAVID ROSS. (Oxford, Clarendon Press. Pp. 251. Price 18s.)

Less than two years after the publication of his full-scale edition of Aristotle's *Analytics* Sir David Ross has given us another work of first-rate importance and interest. Its great value lies partly in the assembling and discussion of all the major problems of Platonic metaphysics, partly in the presentation of Plato's thought as constantly developing ἕως ἔσχε τὴν αὑτοῦ φύσιν, though indeed some students may think the intermediate stage reached in the *Phaedo* and *Republic* more truly "natural" than that of the Idea-Numbers and the mysterious lecture (or, as Sir David holds, lectures) on the Good. Out of 245 pages of text almost exactly one-third is concerned with that latest stage, unknown from, or at most foreshadowed in, the dialogues; but in view of the complexity and difficulty of its doctrines that is not excessive. Many of us, I suspect, breathed a sigh of relief when Professor Cherniss, in his *Riddle of the Early Academy*, assured us that the Idea-Numbers, the "Things after the Numbers," the Great-and-Small, and even the "intermediate mathematicals" were no part of Platonic doctrine, but the outcome of

Aristotle's misinterpretation of (mostly) the *Timaeus* and *Philebus*; save for the enjoyment derived from tracking down the errors of the disciple we felt that we could ignore the master's "unwritten doctrines" as being not only unwritten but unthought of. Yet perhaps we had misgivings: and in the volume before us it is convincingly shown—at least in the opinion of the present reviewer—that Aristotle's account is in essence justified, although we must still tax him with many errors gross enough, of which perhaps the chief was a complete misunderstanding of the so-called "material element" which he terms *τὸ μέγα καὶ τὸ* (sic) *μικρόν*.

At the beginning of his discussion of the "unwritten doctrines" Ross asks: "Is it likely that Plato declined all conversation with the members of his school, in which he might have elucidated what he had written, and have expounded ideas which he had not yet committed, or was never to commit, to paper?" And he answers: "It is really unthinkable." If not precisely unthinkable, it is at least difficult to believe; and yet if it was so, how is it that two of his most eminent pupils, Aristotle and Xenocrates, differed on a point of fundamental importance in the interpretation of the *Timaeus* ? And again, would not such an inquiring mind as Aristotle's have sought oral elucidation on the Idea-Numbers, and on the resolution of those numbers, and of sensible objects, into their elements; and if he had been vouchsafed it, can we suppose him too unintelligent to understand? Or is this perhaps a case for a *distinguo*: to expound doctrine orally is one thing, to answer pupil's difficulties is another; hence it might be suggested that while Plato did propound in his lectures doctrines which he never put, and perhaps never meant to put, on paper, yet he was unwilling—at least in his later years—to elucidate, in response to questions from the class or by way of private conversation with individual members, either those *ἄγραφα δόγματα* or the dialogues themselves.

It is, I suppose, conceivable that the *Timaeus* was not published in Plato's lifetime, perhaps because he was waiting to complete the trilogy to which it was meant to belong; that would explain a good many of Aristotle's doubts and misunderstandings; but there is not a shred of evidence for it, and the publication of the *Sophist* and *Politicus* without the projected *Philosophus* tells against it.

Of the many important conclusions reached in these later chapters perhaps the most important is Ross's retraction of his earlier belief (expressed in the introduction to his edition of the *Metaphysics*) that Plato simply identified the Ideas with Numbers. He now thinks that "he assigned a given number to a given Idea if and only if he thought that the Idea in some way involved that number of elements" (p. 220). I do not find it altogether easy to grasp this interpretation, but it is important to note that it is based not only on the evidence of Theophrastus and Sextus Empiricus but also on a passage (1081 A 12 ff.) in which Aristotle himself appears to call in question his normal view that the Ideas simply *are* numbers.

Among other illuminating conclusions drawn in this connection are: (*a*) that whereas Aristotle represents the "material" element of Ideas and sensibles alike as "The Great and the Small," the truth is that in the former that element is indefinite *plurality*, and in the latter indefinite *extension*; and (*b*) that the "generation" of numbers has nothing whatever to do with the divisional schemes of the *Sophist* and *Politicus*.

I have dwelt first on these later chapters of Ross's book because it is in them that the most novel as well as the most controversial conclusions are to be found. No review, however, and no summary can do justice to the lucidity and persuasiveness with which these conclusions, right or wrong,

are presented. If there is anything to be regretted it is that sometimes Ross has (doubtless from a wish to be fair and undogmatic) devoted more space and argument to the patently foolish notions of certain scholars than they deserved.

To turn now to the earlier part of the book, it is in the *Symposium* that Ross finds the first definite assertion of a transcendent Idea; this will be generally accepted; but it is perhaps surprising that he voices a doubt whether the passage in question is to be taken as serious philosophy. "We have to remember that these are not the words of Plato nor of Socrates: they are put into the mouth of Diotima, the wise woman of Mantinea, and their tone is that of a prophet rather than of a philosopher" (p. 21). But should not doubt be set at rest by Socrates's words *ταῦτα δή . . . ἔφη μὲν Διοτίμα, πέπεισμαι δ' ἐγώ* (212 B)?

The sentence just quoted suggests to me—though I may be entirely mistaken—that Ross is somewhat out of sympathy with what is known as the "mystical" aspect of Platonism. The Theory of Ideas is treated throughout as a fully rational philosophical doctrine: and no doubt it was so in large measure, and its rational side is what needs exegesis: its non-rational side is too apt to evoke a cloudy and unhelpful *Schwärmerei*; yet the vision of the Ideas in the supra-celestial region, so magnificently presented in the *Phaedras*, and such passages as *Republic*, 490 B, with its hint of a *unio mystica* with the ultimate reality, should never be forgotten.

Coming to the *Republic*, Ross has a long, careful and informative discussion of the Divided Line. He decides, very justly, that there is truth both in the "continuity" view (which most of us probably came to know through Nettleship's chapter entitled "The Four Stages of Intelligence") and in Professor Ferguson's belief that the relation between the two lower segments is illustrative of that between the two higher. More doubtful, and more novel, is Ross's conclusion about the *objects* of the two higher segments. "If one method of study is appropriate to one set of Ideas and another to another, it must be because of some objective difference between the two sets" (p. 63). But is the actual procedure of mathematicians in fact deemed by Plato "appropriate"? Without endorsing all that Cornford suggested in his well-known *Mind* papers about the need for mathematical reform, it is difficult to avoid believing that Plato finds that procedure defective, especially in view of 533 B *ὁρῶμεν ὡς ὀνειρώττουσι περὶ τὸ ὄν, ὕπαρ δὲ ἀδύνατον αὐτοῖς ἰδεῖν, ἕως ἂν ὑποθέσεσι χρώμεναι ταύτας ἀκινήτους ἐῶσι, μὴ δυνάμεναι λόγον διδόναι αὐτῶν*: and if *διάνοια* is the right and proper state of mind in reference to mathematical Ideas, what becomes of its analogy with *εἰκασία*? Should we not rather believe that, just as the man who looks at images is studying the same objects as one who looks at their originals, but studying them through their reflections and therefore defectively, so it is with the study of the objects of the two higher segments?

In this same connection I missed a discussion of the puzzling passage beginning *οὐκοῦν καὶ περὶ τοῦ ἀγαθοῦ ὡσαύτως* (534 B), on which Cornford built, rightly or wrongly, so much. On the other hand, Ross cogently rebuts Cornford's notion that there are *two ἀνυπόθετοι ἀρχαί* —the Good for the philosopher and the One for the mathematician—and also Cherniss's, that Plato *never* distinguished the "intermediate mathematical objects" from the Ideas; and before leaving this chapter I should like especially to welcome the convincing defence of the much-queried words *ἀναιροῦσα τὰς ὑποθέσεις*.

The riddle of the *Parmenides* is answered on the lines of Grote and Richard Robinson: the "hypotheses" are intended as a training in mental gymnastic, not as a parody of Eleaticism or Megarianism, nor yet as metaphysical doctrine.

If it is not presumptuous to say so, I believe that this view will hold the field, though it will never satisfy everyone. In the *Sophist* the *εἰδῶν φίλοι* are what Cornford, and others before him, found them to be, namely Plato's earlier self; it may be so, but I should have liked some answer to the point made by Diès in his edition of the dialogue (p. 293): "How," he asks, "could Plato have reckoned himself amongst those who immobilise the universe? One cannot see in what dialogue Plato could have read a phrase of his own that absolutely denied cosmic movement." As to the interpretation of the "Gods *v.* Giants" section, Ross is plainly right in dismissing the notion that the Ideas themselves are pronounced to be in any way subject to change; but has he—or anyone else for that matter—faced the problem presented by the word *ὅσα* at 249 D3?

In his chapter on the *Timaeus* and *Philebus* Ross does not openly enter into the ancient dispute whether or no the *διακόσμησις* was conceived by Plato as an event in time, though I think he implies (as most scholars nowadays would probably agree) that it was not. The Demiurge he regards as a real being, not to be explained away as a figure due to the myth or as a doublet of the World-Soul. On the vexed question of the place of the Ideas in the metaphysical section of the *Philebus* he seems to be right in saying "they are presumably presupposed to be (as they are definitely said in the *Timaeus* to be) that by reference to which the divine reason introduces limit into the unlimited" (p. 138). I may perhaps be permitted a mild gratification at having made this same suggestion in my commentary on the dialogue.

I may conclude this review by two remarks: first, that it has perforce left unmentioned much in this book that I admire; second, that it will be indispensable to serious students of Plato for many years to come.

R. HACKFORTH.

In Defence of Reason. By H. J. PATON. (London: Hutchinson's University Library, 1951. Pp. 288. Price 16s.)

This work consists of a collection of articles or papers written at widely different times, and with one exception already published. The title of the book is intended to give them some unity as being all conceived as having some relation to what is perhaps the most vital philosophical question of the present day, that of the power and function of reason. This unifying relation may well be conceded in general, but it is a case of great diversity in unity. This, however, is all that can be expected in a collection of essays of this type.

The articles printed may be divided into three classes. Firstly, there are essays of historical interpretation which concern themselves with theoretical reason especially in relation to *Kant's Critique of Pure Reason*. They display the great ability which might be expected in the author of Kant's *Metaphysic of Experience*. That they add much to his known views of Kant cannot be expected, but the article on *Kant's Analysis of Experience* provides an admirable summary of the fundamental principle of the transcendental deduction, which the reader of the larger volume may possibly find lost behind a mass of detail. Similarly *Is the Transcendental Deduction a Patchwork?* gives a splendid summary of the objections to the view that we can split up the transcendental deduction into a set of disparate strata. *The Key to Kant's Deduction of the Categories* (a far too ambitious title) and *Kant's So-Called Copernican Revolution* interested me much less, mainly because the conclusions seemed to me so obvious as not to be worth all the elaborate argument. Professor Paton may be congratulated on the lucidity of his

exposition of Kant. *Plato's Theory of Eikasia* (imagination) is the oldest article in the book, much of it having been written before 1914, and is not well in accord with the author's present views. But it certainly seems to me valuable, and the view of art put forward on p. 237 ff. is especially interesting.

Besides these theoretical studies there are two articles on Kant's ethical and political thought, *Kant's Idea of the Good* and *Kant's Views on International Law*. The former might be regarded as almost a summary of the main argument of Professor Paton's book on Kant's ethics, *The Categorical Imperative*. As that work had already shown, he is a strong defender of Kant in face of the more extreme charges levelled against him, and he thinks that there is urgent need of something like Kant's conception of reason in ethics to save the latter study from degenerating into either a list of unproved personal intuitions or a mere expression of emotive attitudes. The second article summarizes a little known work of Kant, *The Metaphysic of Morals—Philosophy of Law*. The work contains much of great interest for the present time, particularly the limitations which Kant imposes on the waging of war. The right of war is allowed in defence of national rights under conditions where there is no legal superior, but the means of warfare are limited to those which are not incompatible with the subsequent resumption of relations on a basis of equal rights, and "Kant ends by asserting that the establishment of a universal and abiding peace is not merely a part, but is rather the whole ultimate purpose of a philosophy of law within the bounds of pure reason" (p. 253). As is well-known, Kant was one of the earliest advocates of a world federation of states to prevent war.

The third class of articles consists of those which express Professor Paton's own views. The article on *Self-Identity* is perhaps the ablest defence I have seen of the view that the self is an abiding unity not reducible to a mere series of events, or at least the ablest statement of the case for it on the basis of theory of knowledge. But the problem which features most in the book is that of the function of reason in practical life. There has been for a long time and still is a strong and pervasive tendency in modern philosophic thought and in modern civilization as a whole to disparage reason and deny it the power to determine on rational principles what we ought to do. This tendency is deplored and opposed by Professor Paton in his first article, *Fashion and Philosophy* (his inaugural lecture as professor at Oxford), and it is very prominent in the author's mind in his sympathetic approach, already mentioned, to the views of Kant. My chief criticism of his line of thought in this book—and it is a defect which is at least much alleviated in his other works—would be that he is stronger on the offensive than on the defensive. He is very good at showing the unsatisfactoriness of opposing views, but he does not make clear what on his view reason can do in ethics. The principle that one ought to judge according to rules applied impartially is completely formal, and he is opposed to the practice of relying on concrete intuitions to supply the content. Perhaps he would still appeal to the coherence test as applied in his earlier book *The Good Will*, and I can well see how this test might be used to confirm or amend intuitions, but not how it could work without their help altogether. He could plead insufficiency of space in a limited article, but it would have been much better if he had seen his way to round off the book with an essay or two giving more insight into his present positive ethical theory. The article entitled *The Emotive Theory of Ethics*, which attacks the view that ethics is just an expression of our emotions, is perhaps the best article in the book. Another, to its opponents morbid, outlook common at the present day is attacked in his article *Existentialism as an Attitude to Life*. Professor Paton's view of exis-

tentialism appeals to me, but I should rather he had conducted his case without going into personalities about Kierkegaard, little as I like what I have seen of the latter's work. Finally, there is a very interesting article on *Justice among Nations*, in which a thoroughly ethical view of politics is defended and the thorny question of peaceful change of treaties tackled wisely. The book as a whole may be strongly recommended both for content and expression. Its tone comes as a bracing breeze in contrast to either the dark obscurities of too many metaphysicians (and "existentialists") or the excessive verbalism of the dominant school in this country at the present time.

A. C. Ewing.

Mind, Life and Body. By Reginald O. Kapp. (London: Constable. 1951. Pp. xvii. Price 12s. 6d.)

This little book is written in a popular style by an enlightened electrical engineer who accepts unshamefacedly a "ghost in the machine theory." Not only does it touch upon the major problems of Mind, Life and Body, but it also contains a number of interesting comments on science and philosophical method. A philosopher may, however, feel some apprehension at Kapp's rather cavalier treatment of the analytical method, his criticism of the technique of definition and his emphasis on the pragmatic treatment of concepts.

The really interesting question with which Kapp tries to grapple is the problem of control; he thinks this to be of supreme importance in understanding the mind-body relationship. Perhaps it is true, as he suggests, that too much time has been spent discussing problems of perception, and too little on this question, though it seems to have been dealt with fairly adequately in discussions on free-will. Under the influence of cybernetic theory the problem of control has of late aroused a good deal of interest among certain scientists. Kapp is, however, careful to avoid the excesses of these enthusiasts and is indeed critical of them.

Nevertheless, he goes a fair way in accepting this theory at least on its physical-neurological side. If one thinks, as Kapp does, of the nervous system as a control system (after the manner of a cascade of electro-magnetic relays) one immediately gets into difficulties, since as mechanisms merely transmit and transform, the control has to be applied by some external agency. Kapp, unlike many of his mechanically minded colleagues, recognizes that the attempt to construct a machine to originate control is like a conjuror producing a rabbit from a top hat. But accepting, as he does, at least part of the mechanical picture, he is forced to postulate an unlocalized primary control outside the nervous system itself. As he points out, the brain, considered as a mechanism, can only make a choice effective, it cannot itself exercise one. Kapp's view is then in a sense a *reductio ad absurdum* of the machine-mind theory. Its similarity to the Cartesian approach hardly needs to be stressed.

Analogies drawn between the brain on the one hand and servo-mechanisms and automatic telephone exchanges on the other, overlook that however many intervening mechanical processes there may be, these devices have initially to be set in action by some human agency. A similar situation occurs in the case of calculating machines; just as the signs of a calculus in order to have significance need a reference to an interpreter, so a control system has an essential reference to an operator and the purpose for which it has been designed.

Unlike physics, engineering science cannot free itself from social evaluations. A bridge for the engineer as well as obeying certain physical laws also

fulfils a specific social function, for example, opening up a new channel of communication. The concept of control is then something extraneous to that of physical causation. We need, therefore, to distinguish between the physics of a control system, i.e. a system for the transmission of energy, and its use in engineering as an instrument for putting into effect certain human decisions. It is doubtful whether in this respect one can talk of a control system without reference to the social purpose which it fulfils. Cybernetics, by introducing engineering concepts into the study of the central nervous system, has overlooked that they are heavily impregnated with value judgments. The failure to give an adequate analysis of the concept of control may yet prove to be its Achilles heel. W. Mays.

CORRIGENDUM

Please note that the publishers of *Radhakrishnan: Comparative Studies in Philosophy*, by various authors, reviewed by Meyrick H. Carré in the January 1952 issue of *Philosophy*, on page 90, are George Allen and Unwin Ltd.

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